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ABSTRACT

Southwest Educational Research Laboratory's (SEDL's) reading project examines early literacy in Grades K-2 and the prevention of early reading failure. The goals of this effort include the following: developing a framework of the cognitive foundations of learning to read that organizes research information; using that framework to organize information about K-2 reading assessment, instructional resources and strategies, and state standards; providing tools and resources that facilitate tracking student achievement data; and assessing the utility of the developed resources with practicing teachers. This framework, "The Cognitive Foundations of Learning to Read," was developed with external consultation over a 22-month period. The framework's content and the organization are derived from scientific research conducted in a variety of disciplines, such as education, linguistics, cognitive science, and psychology. The framework and the complementary resources were developed by SEDL staff in collaboration with 71 elementary teachers representing 7 elementary school campuses in 2 states, New Mexico and Texas. The framework contains the following sections: Creation of a Suite of Reading Resources; History of SEDL's Reading Project; Acknowledgments; SEDL's Framework and Complementary Resources; "The Reading Acquisition Framework: An Overview" (Wesley A. Hoover and Philip B. Gough); The Framework Elements (language comprehension, decoding, background knowledge, linguistic knowledge, phonology, syntax, semantics, decoding and the cognitive elements that support it, cipher knowledge, lexical knowledge, phoneme awareness, knowledge of the alphabetic principle, letter knowledge, concepts about print, reading comprehension, putting the pieces together); Using the Framework and Suite of Knowledge; and Glossary of Framework Elements. (NKA)

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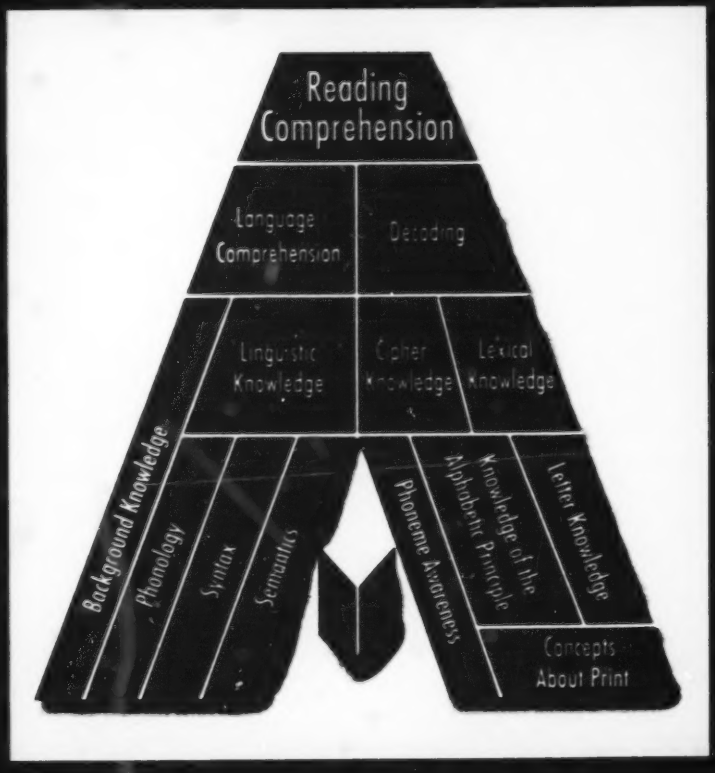
The Cognitive Foundations of Learning to Read

A Framework



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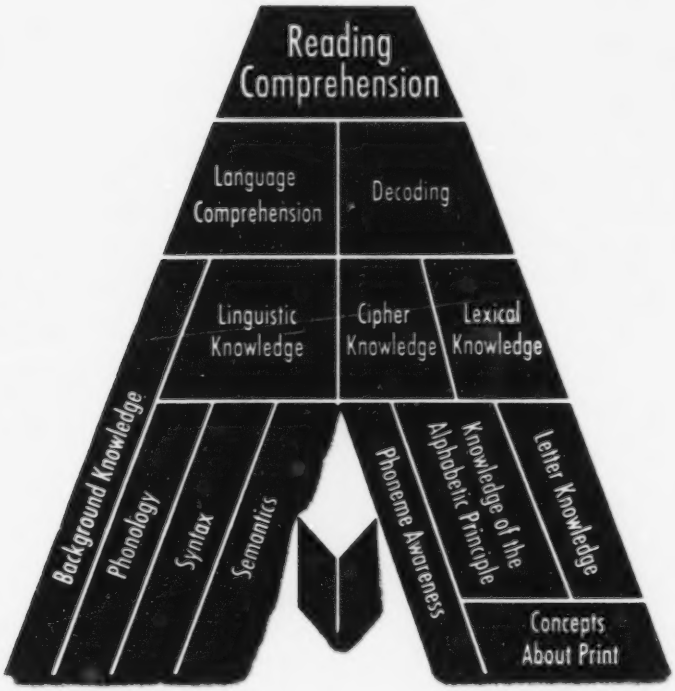

Sebastian Wren

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Aa

CREATION OF A SUITE OF READING RESOURCES

The Southwest Educational Development Laboratory (SEDL) is a private, not-for-profit education research and development corporation based in Austin, Texas. SEDL conducts field-based research and provides research-based resources and information throughout the Southwest region (including Arkansas, Louisiana, New Mexico, Oklahoma, and Texas) in areas like the following:

- linguistic diversity in schools
- the use of technology to support instruction
- comprehensive school reform
- content areas such as mathematics, reading, and science

SEDL's reading project is funded by the U. S. Department of Education and is administered by the Office of Educational Research and Improvement (OERI) under contract RJ96006801. SEDL's reading project examines early literacy in grades K-2 and the prevention of early reading failure. The goals of this effort include the following:

- developing a framework of the cognitive foundations of learning to read that organizes research information
- using that framework to organize information about K-2 reading assessment, instructional resources and strategies, and state standards
- providing tools and resources that facilitate tracking student achievement data
- assessing the utility of the developed resources with practicing teachers

HISTORY OF SEDL'S READING PROJECT

In March 1997 SEDL had the opportunity to propose additional work under its regional educational laboratory contract. Given the critical nature of literacy needs in its five state region, especially in the early elementary grades, SEDL chose to propose work to build materials that would help teachers in the early grades better teach reading.

The idea proposed was straightforward. While the debate about how best to teach reading, whole-language versus phonics approaches, raged over the last 35 years, cognitive science was building a consensus view of the cognitive foundations upon which successful reading

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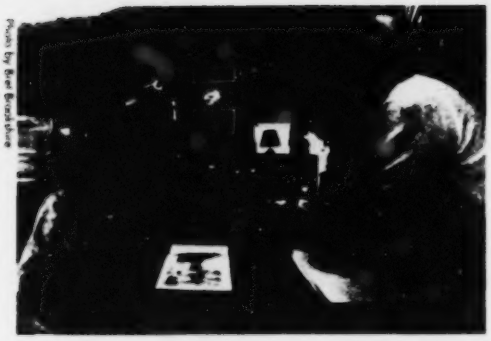

Photo by Bret Bradshaw

competence rested. The educational challenge was to find a way to provide this research base to teachers in an understandable, non-technical way. For if teachers could build their understanding of this research and then tie it to their knowledge of student assessment and teaching techniques, then they would be better able to teach to individual needs. And students would find more success in becoming competent readers in the early grades.

The challenge was to construct a tool that would give teachers access to the research base. To do so, SEDL proposed to build a framework of the cognitive foundations of learning to read, one that would both organize and synthesize the cognitive research on reading acquisition. The framework, including graphic and textual information, would need to show the building blocks upon which reading comprehension rests, defining both the individual components as well as their relationships to each other. Wes Hoover, SEDL's President & CEO, worked with his mentor at the University of Texas at Austin, Philip Gough, to lay out the substance of the framework (its components and their relationships), much of which was based on Gough's collective work in reading acquisition.

Sebastian Wren wrote the text for the framework (except where otherwise noted) and designed the framework graphic. Dr. Wren also designed the ***Reading Assessment Database for Grades K-2***, and wrote the accompanying text, and he collaborated with Jennifer Watts and Iliana Alanis to create the ***Instructional Resources Database for Grades K-2***. Deborah Jinkins used the framework to create the literacy portfolio and to organize the state standards for language arts in each of the five states that SEDL serves (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas). Dr. Wren and Dr. Jinkins collaborated with Brian Litke and Chris Sears to create an interactive Internet-based version of these resources. Susan Paynter provided valuable assistance and feedback as well.

ACKNOWLEDGEMENTS

The framework, titled ***The Cognitive Foundations of Learning to Read: A Framework***, was developed with external consultation over a 22-month period from June of 1998 through June of 2000. The framework's content and the organization are derived from scientific research conducted in a variety of disciplines, such as education, linguistics, cognitive science and psychology. The accompanying text was created to support teachers' understanding of the elements and the structure represented in the graphical framework.

In the course of developing the framework and the complementary resources, SEDL staff collaborated with 71 elementary teachers representing seven elementary school campuses in two states. SEDL would like to sincerely thank the teachers at Algodones, Cochiti, Placitas, and Roosevelt elementary schools in the Bernalillo Independent School District in Bernalillo, New Mexico, the teachers at both the Learning Center and the Elementary School in the Fredericksburg Independent School District in Fredericksburg, Texas, and the teachers at Bruce Aiken Elementary School in the Brownsville Independent School District, Brownsville, Texas. These teachers sacrificed hours of their valuable time consulting with SEDL staff to develop these resources. They provided valuable feedback about the utility and applicability of the cognitive framework and other resources, and their time, experience and hard work are greatly appreciated. We would also like to thank the Bernalillo, NM, Brownsville, TX, and Fredericksburg, TX, Independent School Districts for their support and assistance in this project; without their cooperation, these resources could never have been created.

In the course of completing the final drafts of these resources, SEDL consulted with reviewers and experts from a variety of fields. We want to thank Vicki Altland, Philip Gough, Sylvia Linan-Thompson, Keith Stanovich, William Tunmer, Krista Underwood, Theresa Watson, Jennifer Watts, and Jody Westbrook for their insightful comments and feedback on the framework document. We would also like to thank Carmen Alvarez-Rodriguez, Gloria Barrett, Maria Lydia Borrego, Stella Mata, Norma Muñoz, and Isabel Reyes for contributing activities for the instructional activities database that are appropriate for use with Spanish-speaking children. Finally, SEDL's reading project staff would like to thank our colleagues working on other projects within SEDL who took the time to examine these resources and provide valuable feedback. The time they took away from their own work to help in developing these resources reflects their tireless commitment to quality education. Creating these resources was truly a collaborative effort, and we appreciate the time and energy that people generously donated.

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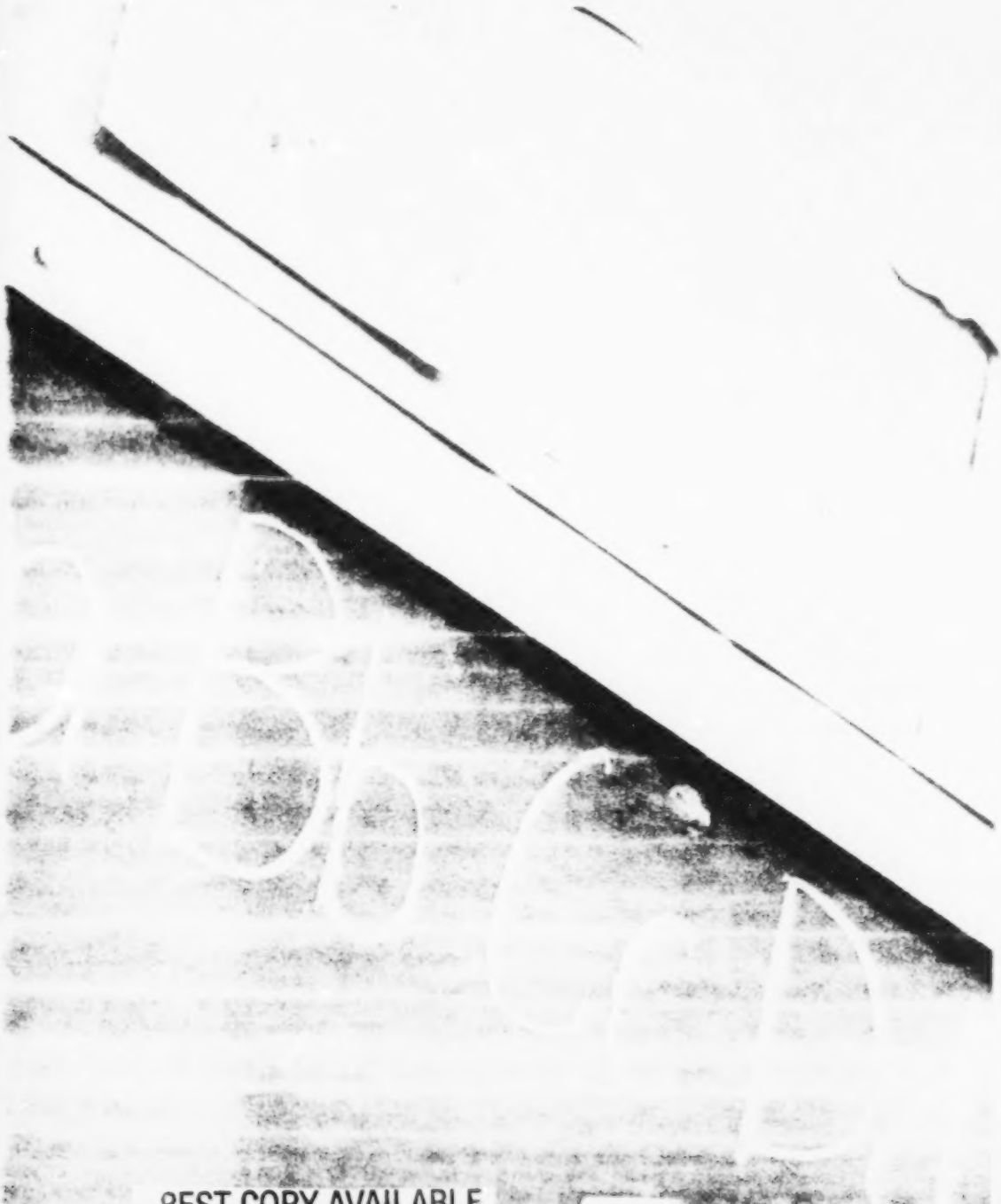
Matthew Effect 8



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SEDL's Framework and Complementary Resources

In the past 30 years, a great deal of research has been conducted in the area of reading acquisition. Researchers have provided a remarkably rich understanding of the process of learning to read, and the implications from that research are far reaching. Unfortunately, this research information is not widely understood by people outside the research community.

There is good evidence that the most effective teachers are ones that have

- A sophisticated, "big picture" understanding of the subject matter to be taught.
- An ability to assess students' instructional needs:
  - What do they already know?
  - What do they still need to learn?
- An ability to meet students' instructional needs with focused and purposeful activities that directly address the areas of need revealed through assessment.

If children are still struggling with reading skills in the third grade, odds are, they will be struggling the rest of their lives.

Attempts to help teachers develop a rich understanding of research information, and, more importantly, to use that information to inform their instruction have not been as successful as one would hope. There is no doubt, however, that teachers do need to develop a sophisticated understanding of this research information. Moreover, it is particularly important that K-2 teachers become experts in reading instruction. Reading instruction is a concern for all teachers (or at least it should be), but research has shown us that reading instruction needs to be a primary concern for K-2 teachers. If children are still struggling with reading skills in the third grade, odds are, they will be struggling the rest of their lives.

K-2 teachers need to become experts in reading in much the same way that doctors are experts in medicine, or mechanics are experts in auto repair. K-2 teachers must be able to think critically about their own instructional practice. They need to be able to articulate ideas and information to their colleagues and to other educators (including principals, school board members, etc.). And they must be able to communicate effectively with parents. A prerequisite for these abilities is a sophisticated understanding of how children learn to read.

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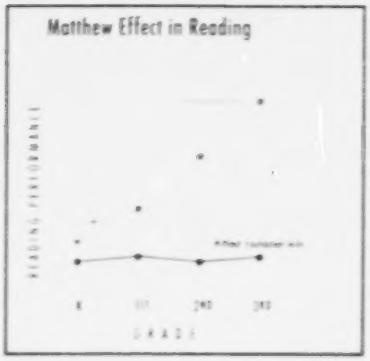

The Matthew Effect was a term drawn from a passage in Matthew's Gospel:

"For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath" (XXV:29).

This passage has been loosely paraphrased, "The rich get richer and the poor get poorer," which is why the passage is so apropos for describing what happens when children fail to develop foundational reading skills in the early grades.

The term "Matthew Effect," as it applies to reading acquisition, was first coined by Herbert Walberg in 1983, but Keith Stanovich deserves credit for popularizing the concept and providing a thorough understanding based on years of research.

According to the Matthew Effect, some children have the good fortune to begin school with the foundational skills that lead to reading success already under their belt. These lucky children come to school on the first day with a knowledge of the alphabet, some concepts about print, and may even have developed phoneme awareness. Other children are not so lucky. They begin school with very little experience with text and literature, and as a consequence, with very little in the way of foundational skills.

What research has shown us is that the difference between these two groups of children is relatively easy to overcome at this young age. As time passes, however, the children with the foundational skills begin learning new reading skills very quickly. If the children who lack the foundational skills do not develop those skills early on, their peers leave them behind. At kindergarten and first grade, the gap is surmountable, and teachers can help all children gain the necessary foundational skills for reading success. Beyond the first grade, however, the gap becomes increasingly larger. By fourth grade, helping children to gain these foundational skills is time-consuming and usually very frustrating for the child. Worse than that, however, it is also usually unsuccessful.

Too often, we are tempted to believe when children are not developing reading skills as fast as their peers, that they will "catch up" if just given time. Research on the Matthew Effect tells us that this myth could not be more dangerous. If a child's reading difficulties are not addressed early, odds are that child will never develop a mastery of text.

Developing an expert understanding of what research says about how children learn to read is not easy. Examining just the important findings of 30 years of research would take years if teachers were expected to seek out original source material. Even summaries that have been produced recently, such as *Preventing Reading Difficulties in Young Children* by the National Research Council and ***Teaching Children to Read*** by the National Reading Panel, are not resources that are easy to pick up and digest. The information contained in these documents (and others like them) is exactly what teachers need to understand, but the presentation of that information leaves something to be desired.

To help teachers to more easily access this vital information and develop a sophisticated understanding of how children learn to read, SEDL has developed ***The Cognitive Foundations of Learning to Read: A Framework***. This is a representation of what is currently known about the underlying cognitive knowledge domains that research has found to be essential to English reading acquisition. The framework provides information about the cognitive elements that must be well developed in every good reader. The information provided in the framework was drawn from a large corpus of research literature, and the connections between the framework and that body of research have been explicated in an electronic bibliography.

The framework is complemented by a graphical image to help teachers visualize how the building blocks of reading acquisition fit together. This graphical image was designed to represent the fact that the ability to read and understand text depends equally upon the ability to decode words and the ability to comprehend spoken language. The graphical representation of the framework resembles the capital letter A, in which two legs come together to form an apex. Analogously, reading comprehension is supported by two equally important "legs"—decoding and language comprehension (or as researchers put it, R=D X C; see sidebar).

To further illustrate the point that reading comprehension is the product of decoding skills and language comprehension skills, the decoding "leg" is blue, the language comprehension "leg" is red, and the reading comprehension "apex" is purple: Blue and red combined make purple. The decoding leg and the language comprehension leg are both comprised of many more basic elements that are arranged to show some of the interrelationships that exist within each of the two major components of reading acquisition.

This framework represents the structure of the foundations of learning to read, but it should not be confused with a description of the process of reading. Reading and learning to read are two related, but different, processes. A great deal of research evidence has shown that the cognitive elements depicted in this framework are essential for a child learning to read, but not all of these cognitive elements are engaged during the actual process of skilled reading. This framework is strictly a description of the cognitive development that must take place for children to learn to read.

The framework, as it is depicted here, provides a rough outline for the order in which these elements typically develop, but only in that a reader needs some level of mastery of the elements in the lower portions of the framework to develop mastery of the elements above. Different

The "Simple View" of reading comprehension, as it was coined by Philip Gough, has been widely supported by research. The Simple View holds that a person's capacity for reading comprehension (R) is determined by that person's ability to decode text (D) and that person's ability to comprehend spoken language (C). In shorthand, then, it is said that R=D X C, where D and C can range in values from 0 to 1. To see this formula working, imagine a child who has absolutely no difficulty understanding spoken language — that child would have a perfect language comprehension score of 1. However, imagine that same child can not decode text at all — hat child would have a decoding score of 0. If you multiply those two numbers together, you get R=1 X 0, which is 0. This hypothetical scenario makes sense intuitively because if the child is not able to decode text, the child can not possibly read and comprehend text. The same is true of the reverse scenario — if D=1 and C=0, then R still equals 0. Children must be able to both decode text and comprehend language in order to comprehend text.

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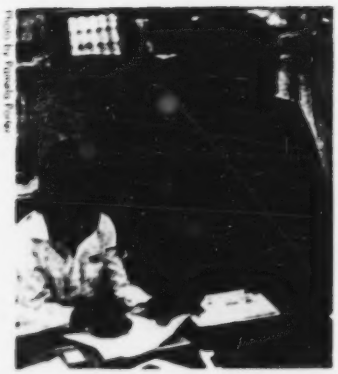


children will make gains in different areas at different rates. This is why assessment is so crucial, and why it makes sense to structure assessment around this framework. Suitable assessments should be conducted, and based on assessment data, the areas of instructional need for individual children should be appropriately addressed.

Because assessment is so crucial to efficient reading instruction, SEDL has developed resources that teachers can use to more effectively gather assessment information about individual students. To help teachers identify available assessments, SEDL has created ***The Reading Assessment Database for Grades K-2***. This is an interactive database available at SEDL's website (and in the accompanying CD-ROM) with current information about reading assessments appropriate for testing children in grades K-2. Features of each test, such as the reading skills measured, the assessment procedures, and the grade appropriateness, are described. Information about how scores are reported and each test's reliability and validity are included as well. The assessments have been correlated with the elements described in the cognitive framework of reading acquisition.

To help teachers track data on individual students over time, SEDL has created ***The Literacy Acquisition Portfolio.***[1] This performance profile reflects the structure of the cognitive framework of reading acquisition and is designed to be an efficient tool that teachers can use to collect and interpret data from multiple assessment sources and disaggregated data from campus reading measures.

In addition to organizing assessment information, the framework can be used to inform instructional decisions. SEDL has developed ***The Instructional Resources Database for Grades K-2***[2] to provide teachers with ideas to enhance specific skills outlined in the framework, and to provide concrete examples of activities that help the teacher see how to connect the framework with actual classroom practice. These examples are drawn from a variety of sources: Some come from teachers who contributed to the database; others come from published resource books. The validity and usefulness of the activities was examined by a team of independent professionals in reading instruction.

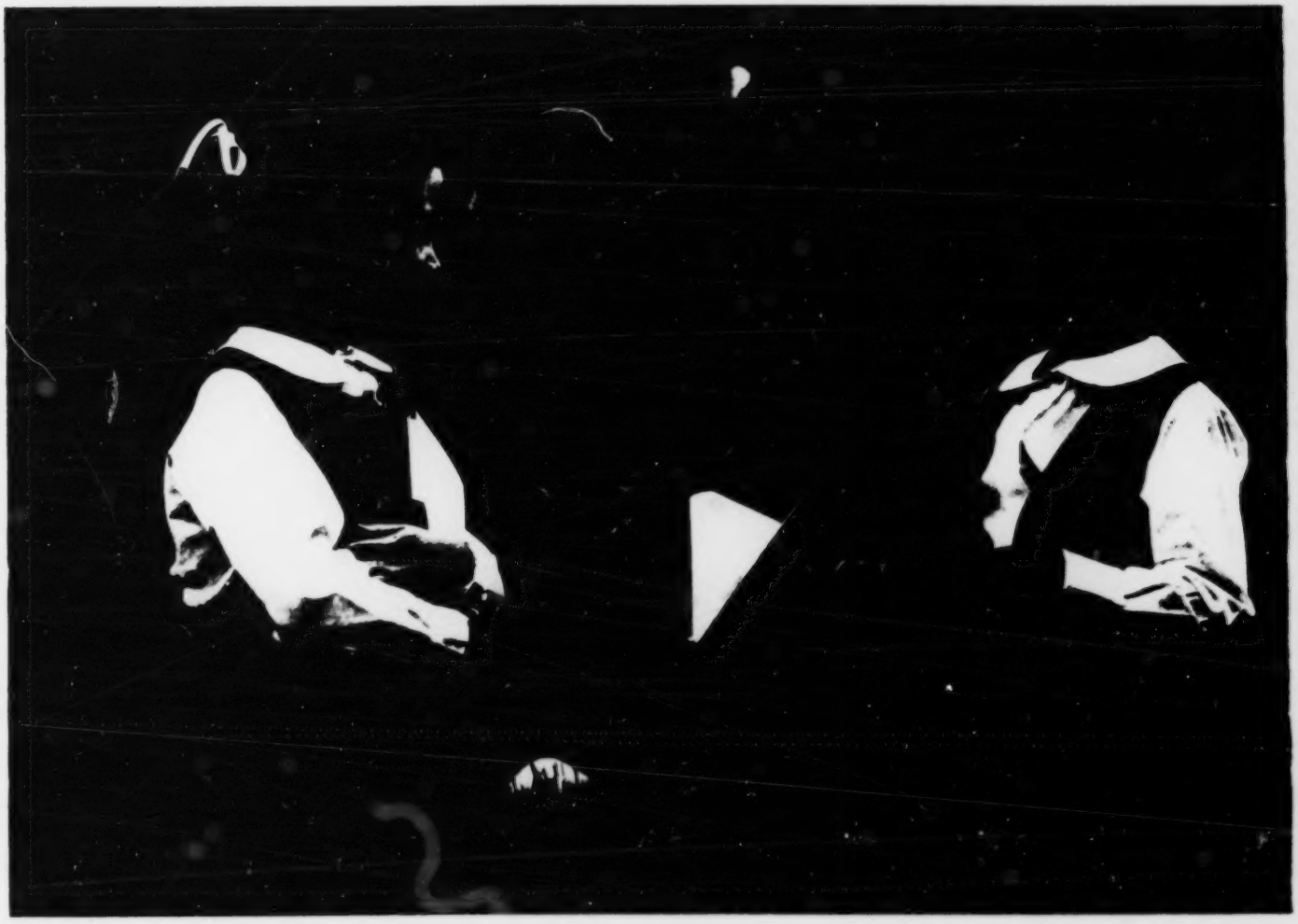
To help teachers understand how the cognitive framework relates to instructional expectations already being placed on them, SEDL has developed ***Connecting State Standards to the Cognitive Framework.***[3] The cognitive framework has been correlated with the standards and benchmarks for each state in SEDL's region (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas). Every K-2 reading standard in each of the five states has been described in terms of the framework elements a child would need to master in order to meet that standard.

[1] Available in SEDL's catalog.

[2] Also available at SEDL's website and on the accompanying CD-ROM.

[3] See note 2 above.

Putting these resources together, the cognitive framework of reading acquisition is designed to help teachers better understand the essential knowledge domains that a child needs to develop in order to become a reader. Once teachers understand the cognitive foundations of learning to read, they can use the ***Reading Assessment Database for Grades K-2*** to select assessments that measure each of the essential elements outlined by the cognitive framework. Teachers can use ***The Literacy Acquisition Portfolio*** to keep track of each child's data over time, collected through both formal and ongoing informal assessment. Whenever reading-related strengths and weaknesses are identified for a particular child, the teacher may want to turn to ***The Instructional Resources Database*** to get examples of focused classroom activities that can be used to support growth in specific cognitive elements. Teachers can further use ***Connecting State Standards to the Cognitive Framework*** to confirm that structuring their instructional practices around the framework meets the expectations outlined in their state standards.



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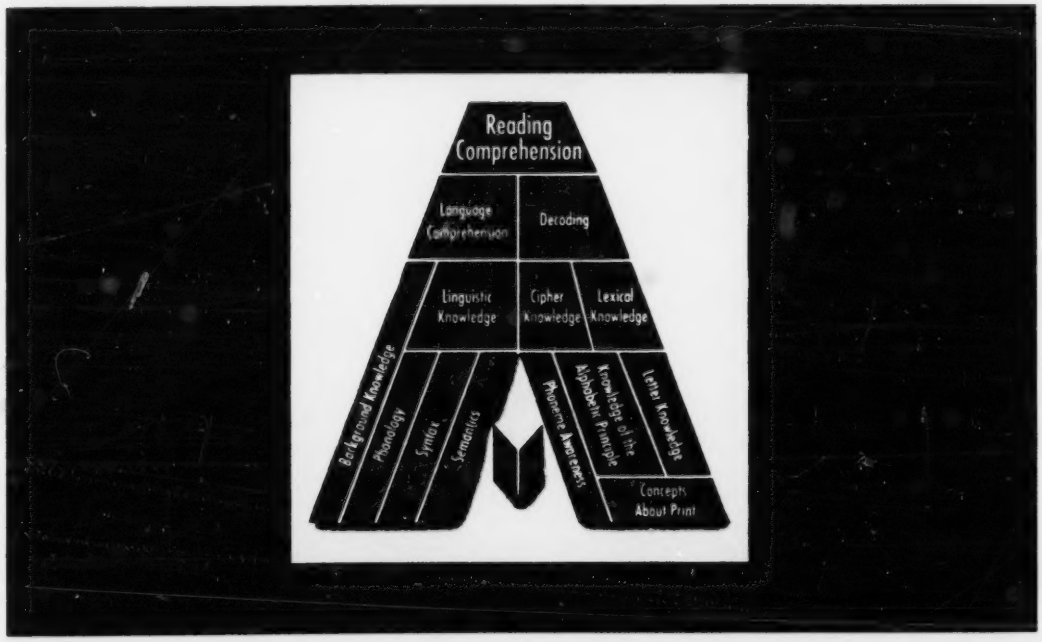
The Reading Acquisition Framework: An Overview by Wesley A. Hoover and Philip B. Gough

From the cognitive perspective of learning to read, reading comprehension (or, simply, reading) is the ability to construct linguistic meaning from written representations of language. This ability is based upon two equally important competencies. One is language comprehension—the ability to construct meaning from spoken representations of language; the second is decoding—the ability to recognize written representations of words. These two main foundations of reading are represented by the two supporting legs in the graphic depiction of this cognitive framework.

Both of these are complex abilities themselves, each based on other abilities, as shown in the graphic. In this simple view of reading, both language comprehension and decoding are necessary for reading comprehension success. Neither is sufficient in itself. On the one hand, being fully competent in a language but having no ability to recognize its written words will not allow successful reading comprehension. On the other hand, neither will having the ability to recognize the written words of a language but not having the ability to understand their meaning. In this view, the only route to successful reading comprehension is through success at both language comprehension and decoding. Weakness in either ability will result in weak reading comprehension. Thus, knowing where obstacles to reading and its acquisition exist requires assessing both language comprehension and decoding abilities. Let's consider the abilities needed for success in these two broad domains.



The ability to read and understand a passage of text depends upon two equally important skills:

- the ability to decode the words in the text
- the ability to understand the language the text is written in

Children who do not have problems understanding spoken language and who are able to fluently and easily decode text do not have problems with reading comprehension. On the other side of the coin, children who do have problems with reading comprehension always have problems with either the ability to understand language or the ability to decode written words (or both).

There are three basic types of reading disorder (ranked in order from least common to most common):

- Hyperlexia, which is characterized by the ability to rapidly and easily decode text without understanding what is being read (very rare).
- True dyslexia, or the ability to understand spoken language but an inability to decode text (less rare).
- Garden-variety reading disorder, which characteristically involves a difficulty decoding text and a difficulty understanding spoken language (relatively common).

LANGUAGE COMPREHENSION

The ability to construct the meaning of spoken language, or language comprehension, requires a complex mix of different abilities, each somewhat dependent on the other. However, two large domains of knowledge are required for success. The first is linguistic knowledge, or knowledge of the formal structures of a language. The second is background knowledge, or knowledge of the world, which includes the content and procedural knowledge acquired through interactions with the surrounding environment. The combination of these two allows us to make inferences from language. We can go beyond the literal interpretation allowed by competence in the language, to inferences from language that are built in combination with our knowledge of the world. For example, entering your house on a cold winter day and being told that the door is still open allows you to infer that the speaker would like you to close it! The following text more fully describes each of the two domains that underlie such comprehension.

Linguistic Knowledge

Knowledge that underlies competence in a language can be divided into three large domains. Phonology describes knowledge of the sound structure of a language and of the basic elements that convey differences in meaning, including their internal structure and their relationships to each other. The child who cannot produce or hear the sounds that distinguish one word from another will not be able to use language effectively to communicate. Semantics deals with the meaning components of language, both at the level of individual units (words and their meaningful parts, or morphemes, such as "pre" in the word "preview") and at the higher levels that combine these units (morphemes into words, words into sentences, sentences into discourse).

Thus, part of linguistic knowledge involves learning the individual meanings of words (or vocabulary) as well as the meaning of larger segments—sentences and discourse structures (e.g., narratives and expositions). Syntax constitutes the rules of language that specify how to combine different classes of words (e.g., nouns, verbs, adjectives) to form sentences. In short, syntax defines the structural relationship between the sounds of a language (phonological combinations) and the meaning of those combinations.

Background Knowledge

Knowing how the everyday world works, both in terms of content and procedures, is a crucial component of language comprehension. While linguistic knowledge represents the rules for how language operates, background knowledge represents the substance on which language operates. In communicating through language, successful comprehension requires both the ability to use the language and knowledge of the substance to be communicated. One way to describe such knowledge is in terms of schemas—structures that represent our understandings (e.g., of events and their relationships). Schemas can represent fairly common knowledge (e.g., dining in a restaurant, including being seated, ordering, being served, eating, and finally paying a bill) or fairly esoteric knowledge (e.g., how computer programs complete searches for information). If you have a well-developed schema in a particular domain of knowledge, then understanding a conversation relevant to that domain is much easier because you already have a meaningful structure in place for interpreting the conversation. Now let's consider the other major component of reading comprehension.

DECODING

Alphabetic languages are those whose writing systems relate the written and spoken form of words systematically. In English, both systematic and unsystematic (or idiosyncratic) relationships exist, and the successful reader must master both. Decoding is the ability to recognize both types of relationships between written and spoken words. And both of these are necessary for successful word recognition. Knowing these systematic relationships allows us to read many new words that we've never before encountered in written form. Knowing the exceptions allows us to access the meaning of a known word whose spelling violates the systematic relationships.

Cipher Knowledge

The systematic relationships between written and spoken words are those that consistently relate the units of the written word (the letters of the alphabet) and the units of the spoken word (not the sounds themselves, but the abstract units—the phonemes—that underlie the sounds). Knowledge of these relationships is known as cipher knowledge. As an example, a word like "pad" exemplifies a systematic relationship between three letters and three phonemes. But "colonel" represents a systematic relationship between only its initial and latter units, not its medial ones (contrast this with the systematic relationship in "colon"). If a child learns the systematic relationships, she can recognize words she has never before encountered in print, but whose meaning she already knows from the course of language acquisition. This is the typical situation for the child learning to read.

Lexical Knowledge

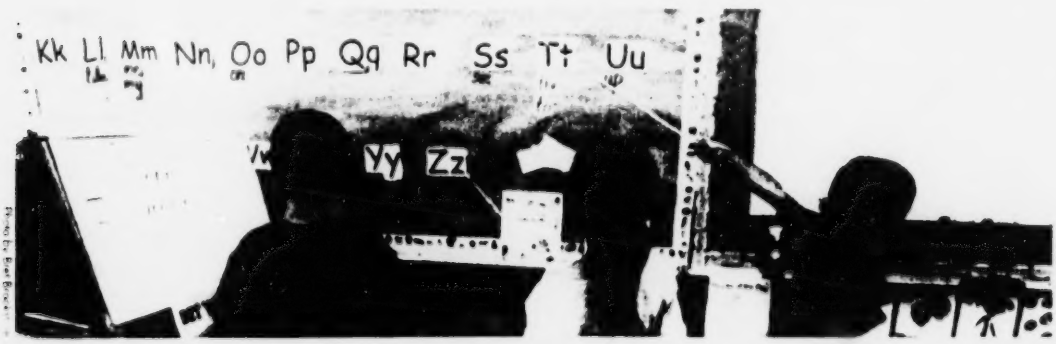
Beyond the systematic relationships captured in cipher knowledge are the exceptions—those instances where the relationships between the units of the spoken and written word are unique and do not follow a systematic pattern. Knowledge of these exceptions, or lexical knowledge, is necessary for a child to be able to access the meaning of words she knows (e.g., "stomach") but that do not entirely follow the patterns captured in her cipher knowledge.

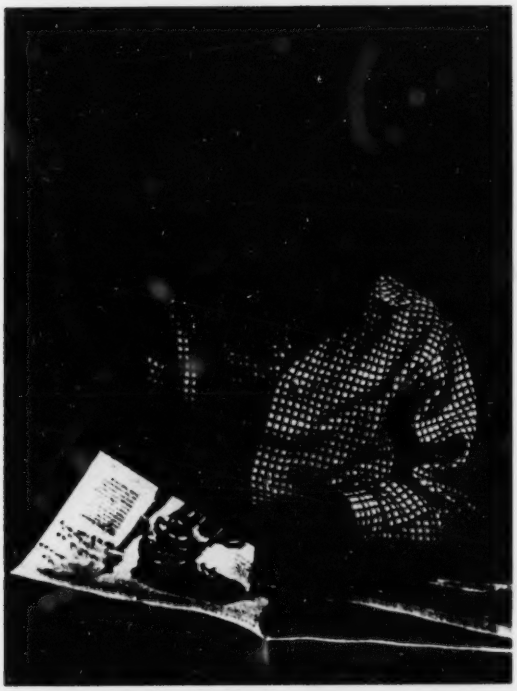
THE BASIS OF CIPHER AND LEXICAL KNOWLEDGE

To learn the two types of relationships upon which decoding ability depends, a number of other abilities are needed.

Letter Knowledge

The first is letter knowledge, or the ability to recognize and manipulate the units of the writing system. In English, these units are the letters of the alphabet. Knowing the names of letters is not what is crucial here (although most children learn to distinguish letters by learning letter names); rather, what is important is being able to reliably recognize each of the letters.





Phoneme Awareness

In a similar fashion, one must be consciously able to recognize and manipulate the units of the spoken word—the phonemes that underlie each word. The knowledge behind this ability must be explicit, not implicit. That is, any child who knows a language can implicitly recognize and manipulate the sounds of the language that mark differences in meaning between words (e.g., "bat" and "bag" as different words with different meanings). However, knowing explicitly that this distinction in meaning is carried by a particular unit in a particular location (i.e., by the last unit in the preceding example) does not come automatically with learning the language. It is something that in most cases must be taught in order to be learned. This knowledge is phoneme awareness: the conscious knowledge that words are built from a discrete set of abstract units, or phonemes, coupled with the conscious ability to manipulate these units.

Knowledge of the Alphabetic Principle

Finally, it is not enough to simply know and be able to manipulate the units of the written and spoken word. To master both the cipher and lexical knowledge components of decoding, one must understand that there is, in general, a systematic relationship between these units, and that discerning the particular relationship is what is required to master decoding. Without the intent to discover this relationship, the would-be reader will not understand the task before her. This intent is captured in knowledge of the alphabetic principle: knowing that a systematic relationship exists between the internal structure of written and spoken words, and that the task of learning to recognize individual words requires discovering this relationship.

Concepts about Print

Finally, the basis for knowledge of letters and the alphabetic principle is knowledge of the mechanics of the printed word, or concepts about print. This includes knowing that printed text carries a linguistic meaning, that there is a correspondence between printed and spoken words, and that text in English runs left-to-right and top-to-bottom on a page.

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The Framework Elements

Let's begin by picturing a child sitting in a comfortable chair reading a book silently to herself. She's just sitting there, fairly motionless, staring at a book. Occasionally, she turns a page. Sometimes she laughs quietly to herself for no apparent reason. It is a serene and beautiful picture, but only because we know that inside her head, she is exploring a story and listening to the author tell a tale through a voice that only she can hear. If she was sitting motionless, occasionally laughing to herself while staring intently at a potted plant, it would be somewhat disturbing, but because she is acting this way with a book in her hands, it's a Kodak moment.

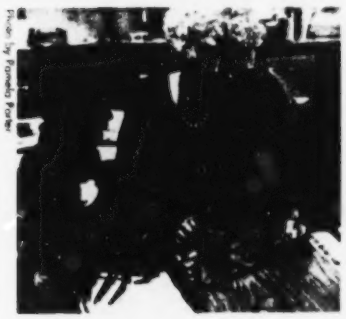
The silent, motionless act of reading belies the activity happening inside the reader's head. The symbols on the page are being converted into a meaningful message that the reader understands—a message constructed by an author that she has probably never met. In the reader's head, the author's tale is unfolding word-for-word exactly as the author wrote it, but the reader scarcely moves a muscle.

As the reader sits motionless, she is simultaneously decoding the text and comprehending the message contained within the text. That is what reading is all about—decoding and comprehension. The integration of these two skills is essential to reading, and neither one is more or less essential than the other. If somebody was kind enough to read the story out loud to her, she would not need to decode it herself. She could sit with her eyes closed, listen to somebody else tell the story, and just focus on comprehending it. The comprehension she experiences listening to somebody else read aloud is the same comprehension she would experience reading the text silently to herself. There are subtle differences, but essentially, the only thing that makes reading different from listening is the act of decoding the text.

That is what reading is all about—decoding and comprehension.

If reading is the product of two cognitive elements (language comprehension and decoding), two questions must be addressed:

- What is required to be good at understanding language?
- What is necessary to be good at decoding text?



Examining each of these elements, we find a collection of interrelated cognitive elements that must be well developed to be successful at either comprehending language or decoding. This text will examine both language comprehension and decoding, along with the subordinate cognitive elements that underlie each. All of these underlying knowledge domains will be described as discrete and distinct cognitive elements, but only for the benefit of this examination. It is important for reading teachers to understand what these elements are and how they fit in the "big picture" of reading acquisition, but it is also important for teachers to understand that these elements are all interdependent and interrelated in a child's head.

Let us begin this examination of the cognitive processes involved in reading acquisition where the child begins—with Language Comprehension.

LANGUAGE COMPREHENSION

Language comprehension generally refers to one's ability to understand speech (there are other forms of language, but for the sake of the current conversation, we will only consider speech). It is important to remember that language is not at all generic. There are different "levels" of language. Adults do not speak to children the way they speak to other adults; stories for adults are aimed at a "higher level" than stories for children.

Further, there are different types of language. Language can be informal, as it often is in routine discourse among friends and family, or it can be formal, as it often is in classroom environments. Informal language for young children is usually very context dependent; the conversation typically focuses on information that is immediately relevant and often concrete. Formal language, on the other hand, is often decontextualized and abstract (e.g., asking a child to retell a story or to consider the perspective of a character in a story). Some children have more experience with formal language than others, and naturally, this gives them an advantage in formal classroom learning environments.

It is also worth noting that there are different types and levels of language comprehension. The most mundane form is explicit comprehension—the listener merely understands what is

explicitly stated. The listener may not draw any inferences or elaborate on what is said, but at least the listener understands what is specifically stated.

A more elaborate form of language comprehension builds inferential understanding on top of explicit comprehension. Sometimes, in order to truly understand language, the listener must consider the context in which communication is taking place. Sometimes, one needs to "read between the lines" and draw inferences. Sometimes, these inferences are context dependent, meaning that it is necessary to consider the speaker and the audience. Consider the following statements out of context: "My car broke down the other day, and it's going to cost $2000 to fix! This couldn't have come at a worse time, either. Bob Junior needs braces, and Mary hasn't been able to work very many hours recently."

In real communication sometimes the true message is never explicitly stated.

Out of context, this person seems only to be seeking sympathy. However, what would you think about these statements if you knew that this person was speaking to his boss? He never says it explicitly, but it is obvious that he is asking for a raise. In real communication, sometimes the true message is never explicitly stated—the listener must deduce the speaker's intent behind the message.

For language to work, it is assumed that both the speaker and the listener are cooperating in their communication: The speaker is attempting to convey only the information that is relevant and interesting for the listener; the listener is trying to ascertain the important and relevant message that the speaker is conveying.

The context, the nature of the discourse, the speaker's underlying intent—these and many other factors are important to comprehension. Often, what is not said is as important to the communication as what is said. Consider these quotes taken from actual performance evaluations used by the military to determine qualifications for promotion:

- "He is inquisitive, and his wife is charming."
- "I am quite confident that he has many admirable qualities."
- "His performance under my command has never once dropped below average."

Photo by Bert Brookshire

Are there hidden messages in these evaluations? None of these evaluations are particularly negative or derogatory, but the very fact that they are not laudatory speaks volumes. In these evaluations, the speaker is trying not to explicitly say something, and hopefully, the listener will hear what the speaker is trying so hard not to say.

More than just an appreciation for the social context of communication and the ability to draw inferences, language comprehension involves a general awareness that the purpose of communication is to coherently convey information. Children need to develop an understanding of different genres, voices, perspectives, and styles. Children also need to understand how those elements may reflect the intent of the speaker, author, or storyteller, and how those elements affect the underlying meaning of communication. Young children typically do not have a well-developed appreciation of the pragmatics of speech, and teachers must often draw their attention to these comprehension skills explicitly.

It is also relevant to note that, particularly in the Southwest United States, sometimes there are cross-language issues related to language comprehension. A child's native language may be Spanish, and she may have high levels of understanding in Spanish, but if she is in a classroom in the United States, her language comprehension is most likely being assessed in English.

Language comprehension in this context, then, refers to the child's ability to understand and draw inferences from speech that is in a language the child understands, and that is at a level the child should be able to understand. If a child is expected to read English text, the child must understand spoken English adequately. If the child does not speak English, the text will be more meaningful if it is written in the language the child does speak and at a level she understands.

The importance of connecting the child's spoken language to the text is paramount, but it is frequently overlooked when assessing the reading instruction needs of children. This is not just a concern when addressing the needs of students who are learning English as a second language, or addressing the needs of children who speak a non-standard dialect of English. This is a concern that every reading teacher of every child should be aware of. Some children—English speaking children—grow up in an impoverished linguistic environment. Despite the fact that English is their native language, their language comprehension skills are underdeveloped. Furthermore, explicit instruction aimed at developing linguistic comprehension usually takes a back seat to explicit instruction of text-awareness or decoding skills in the classroom. The balance is important, and reading teachers need to consciously maintain that balance.

DECODING

The second important element underlying reading comprehension is decoding, which generically refers to the child's ability to recognize and process written information. While that may sound straightforward, it should be noted that children may try many different, often inappropriate decoding strategies before they become skilled decoders.

Initially, children learn that certain symbols "stand for" concepts, but these symbols are highly contextualized. For example, many children recognize the golden arches of McDonald's restaurants—these children recognize that the golden arches represent a concept, which in this

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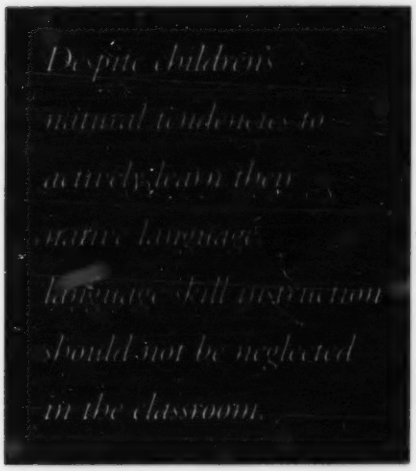
case is food that they would like to eat. This is sometimes called "environmental print reading," and, although it signals that the child is on the road to literacy, it is not the same as "decoding." In this case, the symbols and words the child recognizes depend upon their context for recognition. The child may recognize the word "milk" when it is written on the milk carton, while failing to recognizje that same word when it is in a storybook. Similarly, a child may recognize the word "McDonald's" when it is accompanied by the golden arches, but may be unable to recognize it out of that context.

Farther along the road to decoding, children typically develop the ability to recognize certain high-frequency and familiar words. This is sometimes called "sight-word reading." It involves the child memorizing the shape of each whole word, or some unique feature in each word, and recognizing it when it comes up in print. This approach works only for a very short time. Children can only memorize so many words, and as their "sight vocabulary" grows, their capacity for learning new words diminishes. They tend to confuse words and forget words. Sight-word readers are limited to the words that they have memorized—they can not make sense of unfamiliar words, and can not read text that is comprised of words outside of their sight vocabulary.

As emergent readers become more advanced, they learn how to use the conventions of written English to "sound out" or "decipher" words. This approach is generative, which means there is no limit to the number of words that can be created or read by those with this ability. Consequently, young readers who can decipher words can make sense of words they have never encountered before in print.

Unfortunately, in English, there is more to decoding than using the conventions of written English to decipher words. In English, virtually every spelling-sound convention has exceptions—English text would make more sense if "one" sounded like "own" and if "too" did not sound like "two," but in English, there are a host of words whose correct pronunciations violate the conventions of English spelling-sound relationships in some way. To become an expert decoder, a child needs to learn to decipher words, but further, the child needs to begin learning how to correctly identify irregular or exception words.

It is important to note that learning irregular words is a process that develops throughout a reader's life. Even adult readers come across new words that are not pronounced the way they are spelled. (How do you pronounce "calliope"?) However, it is reasonable to say that readers are decoding text appropriately if they are correctly recognizing irregular or exception words within their vocabulary and pronouncing unfamiliar words in a way consistent with the conventions of written English.


Despite children's natural tendencies to actively learn their native language, language skill instruction should not be neglected in the classroom.

The elements that support language comprehension and decoding

We have described reading comprehension as the product of decoding skills and language comprehension skills—both of which depend upon more fundamental cognitive elements. Each of these elements is worth examining in some detail.

Language comprehension and the cognitive elements that support it

Children learn their native language relatively easily—they do not need much in the way of explicit instruction to learn basic communication skills. Unless they are severely deprived of opportunities to experience their language, almost all children develop those functional communication skills long before they enter school. This process of language acquisition starts very early—in fact, there is evidence that children begin learning about certain aspects of language while still in the womb. After they are born, children naturally practice and experiment very actively with language.

Despite children's natural tendencies to actively learn their native language, language skill instruction should not be neglected in the classroom. Some children need to be taught some aspects of language formally and explicitly. Children may need little formal instruction to be able to communicate basic needs, but for academic success in a formal learning environment, children need to be versed in certain aspects of formal language, decontextualized language, and metalinguistic knowledge.

It is rare to find children whose language experiences are so impoverished that their language development is inadequate for basic communication, but it is not uncommon to find children who are not prepared to deal with the formal, decontextualized language used in classrooms. Some children are raised in homes where more formal, decontextualized language is common, and their early experiences with formal language prepare them for the more formal learning environment of a classroom. However, other children do not benefit from such rich and diverse language experience. While their language experience is typically adequate for basic expression and typical discourse, they are at a disadvantage when trying to function in academic settings.

Teachers should make no assumptions about their students' language comprehension skills. They should know that the children in their classes do not necessarily come from similar linguistic environments and may not have approximately equal language development. Every child's language skills need to be assessed, and areas of need should be addressed.

BACKGROUND KNOWLEDGE

To have strong language comprehension skills, children must know about the world in which they live, and must have elaborate background knowledge that is relevant to what they are trying to understand. This knowledge is more sophisticated than mere facts or word definitions—it is a reference base for personal experiences, scripts, and schemas that help those children understand how the world works.

To really understand and appreciate a story, children need to know more than the definitions of words in the story; they need to have a frame of reference so they can make sense of the plot.

Children learn by comparing new information against information they already have in their heads, and that information must be relevant to the story they are listening to. "Casey at the bat," for instance, makes more sense to people who are familiar with baseball, and teaching children about baseball will help them to appreciate "Casey at the bat." This point seems trivially obvious, but the issue is raised here to emphasize a non-trivial point—not all children have the same background knowledge. Children can not understand what is being said to them if they do not share some background knowledge with the speaker. Likewise, they can not understand a story if they do not have some background knowledge related to the topic of the story.

Similarly, children depend on life experiences to develop schemas and scripts about how the world should work. Certain events are more likely to happen at a baseball game than at a restaurant, and events typically take place in a certain order or sequence. We depend on our internal schemas and scripts to help us organize and anticipate events in a story.

Instruction tip: Typically, the problem that children have with comprehension is not that they lack knowledge in a general sense—the problem is that the knowledge that they do have is not relevant to what they are trying to understand. You can either provide background knowledge relevant to activities (e.g., before telling stories about a zoo, the class could take a field trip to the zoo), or you can search for stories that are relevant to the knowledge you know the children already have (making the classroom materials relevant to the backgrounds and cultures of the students).

Assessment tip: It is safe to assume that all children have knowledge, but it is not safe to assume that the knowledge they have is relevant to a particular activity. Before starting an activity, sample the children's knowledge about the content of the activity with some informal questions.

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LINGUISTIC KNOWLEDGE

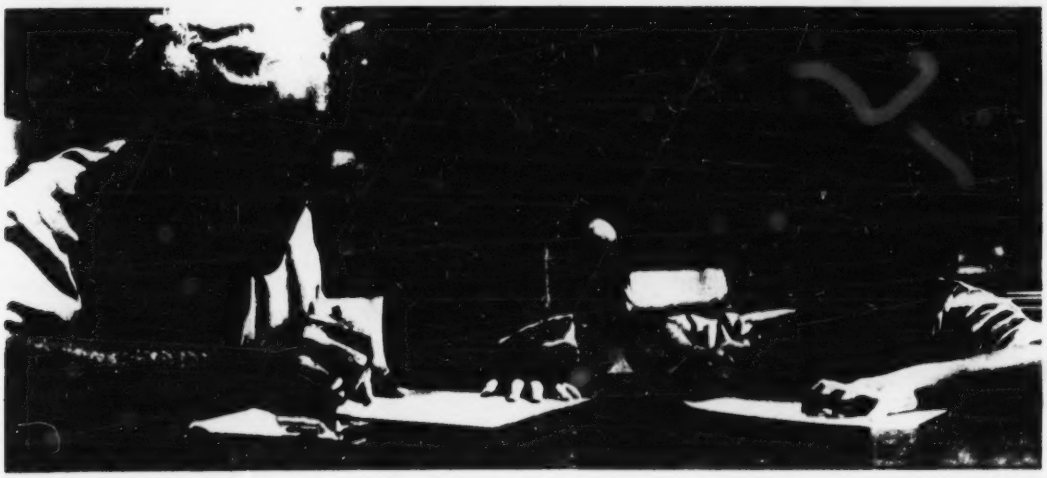
Languages are composed of sounds that are assembled to form words, which are combined to form sentences, which are arranged to convey ideas. Each of these processes is constrained and governed by linguistic rules. An implicit knowledge of their structure and their integration is essential to language comprehension. Three basic elements come together to support linguistic knowledge:

- To understand language, one must be able to hear, distinguish and categorize the sounds in speech (phonology).
- One needs to be implicitly familiar with the structure that constrains the way words fit together to make phrases and sentences (syntax).
- One must be able to understand the meaning of individual words and sentences being spoken and the meaningful relations between them (semantics).

Linguistic knowledge depends upon all three elements—phonology, syntax, and semantics—being synthesized rapidly and fluently. Each of these elements can be examined in some detail.

PHONOLOGY

To understand spoken language, a child must be able to hear and distinguish the sounds that make up the language. Virtually every child raised in a normal linguistic environment has the ability to distinguish between different speech sounds in her native language. Almost all native English speakers can therefore hear the difference between similar English words like "grow" and "glow." When children produce these words themselves, however, they may not be able to articulate distinctly enough for others to hear the distinction. Difficulty with articulation does not imply difficulty with perception.



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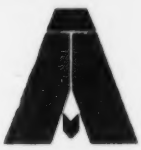
Hearing the difference between similar sounding words such as "grow" and "glow" is easy for most children, but not for all children. Some children are raised in homes where English is not spoken, or where non-standard dialects of English are spoken. Likewise, some children suffer auditory trauma or ear infections that affect their ability to hear speech. Any child who is not consistently exposed to English phonology may have difficulty perceiving the subtle differences between English phonemes. Obviously, children who are not able to hear the difference between similar-sounding words like "grow" and "glow" will be confused when these words appear in context, and their comprehension skills will suffer dramatically.

Instruction tip: Children usually have problems articulating certain sounds, but even though they may say the words inappropriately, they can usually hear the differences when somebody else speaks. In other words, they do not have a problem with phonology; they have a problem with articulation. You can address this problem when a child says a word incorrectly by parroting what the child said back to the child in the form of a question. If the child says, "I want to go pray outside," ask the child, "You want to go pray outside?" The child with normal phonologic skills will repeat herself, emphasizing the indistinct word, and try to make you understand what she is trying to say.

Assessment tip: Play the "same or different" game. Generate pairs of words that are either identical or that differ in a subtle way. Say them out loud and ask the child if they are the same or different. Children should rarely miss the ones that are different. If the child misses more than just a few, consult with a speech therapist or an audiologist.

SYNTAX



In German, the main verb typically comes at the end of a clause. In Romance languages, adjectives typically follow the noun. Different languages have different rules of syntax that constrain the way words and phrases can be arranged. In another language, the sentence, "Billy has a black dog" might be written, "A dog black Billy has." However, the rules of English syntax prohibit us from rearranging the words in sentences haphazardly. The way that words are arranged in English sentences has a fairly stringent structure, and one does not need to be able to formally diagram sentences to understand that structure implicitly.

The stringent structure of English syntax is not accidental. Syntax provides some meaning and helps minimize ambiguity. Consider these actual newspaper headlines:

- "Enraged Cow Injures Farmer with Ax"
- "Two Sisters Reunited after 18 Years in Checkout Counter"
- "New York Police Kill Man with Hammer"

All of the words make sense, but the poor syntax makes the sentences ambiguous. People who have a limited appreciation for English syntax may not understand why these sentences are confusing.

Syntax can also help people figure out meanings for unfamiliar words. For example, consider the sentence, "I fell asleep while waiting for Mary to return from the tembal." Your knowledge of English syntax helps you to develop some ideas about what "tembal" might mean, but if you were not familiar with English syntax, you might not even know that "tembal" is a noun.

The fact that the rules of syntax change from language to language can confuse people learning English as a second language. However, again, this is not exclusively a problem for second language learners. Children who come from impoverished linguistic environments are usually comfortable only with very simple syntactic structure. Unfortunately, without a moderately sophisticated implicit understanding of the rules of syntax, language comprehension is severely limited for these children, especially when they are expected to work in more formal linguistic settings like schools.

Instruction tip: Invite the class to sit outside in a circle on the grass. Ask them to close their eyes and listen. Remain silent. After a few seconds, ask students what they heard. The activity may need to be repeated several times for children to become comfortable with the activity. Initially, ask students to tell you what they heard in simple sentences. Example: "I heard a bird." "I hear a dog barking." Later, ask students to describe what they heard in more complex syntax ("First I heard a bird, then I heard a dog barking, and the whole time, I could hear the wind blowing.").

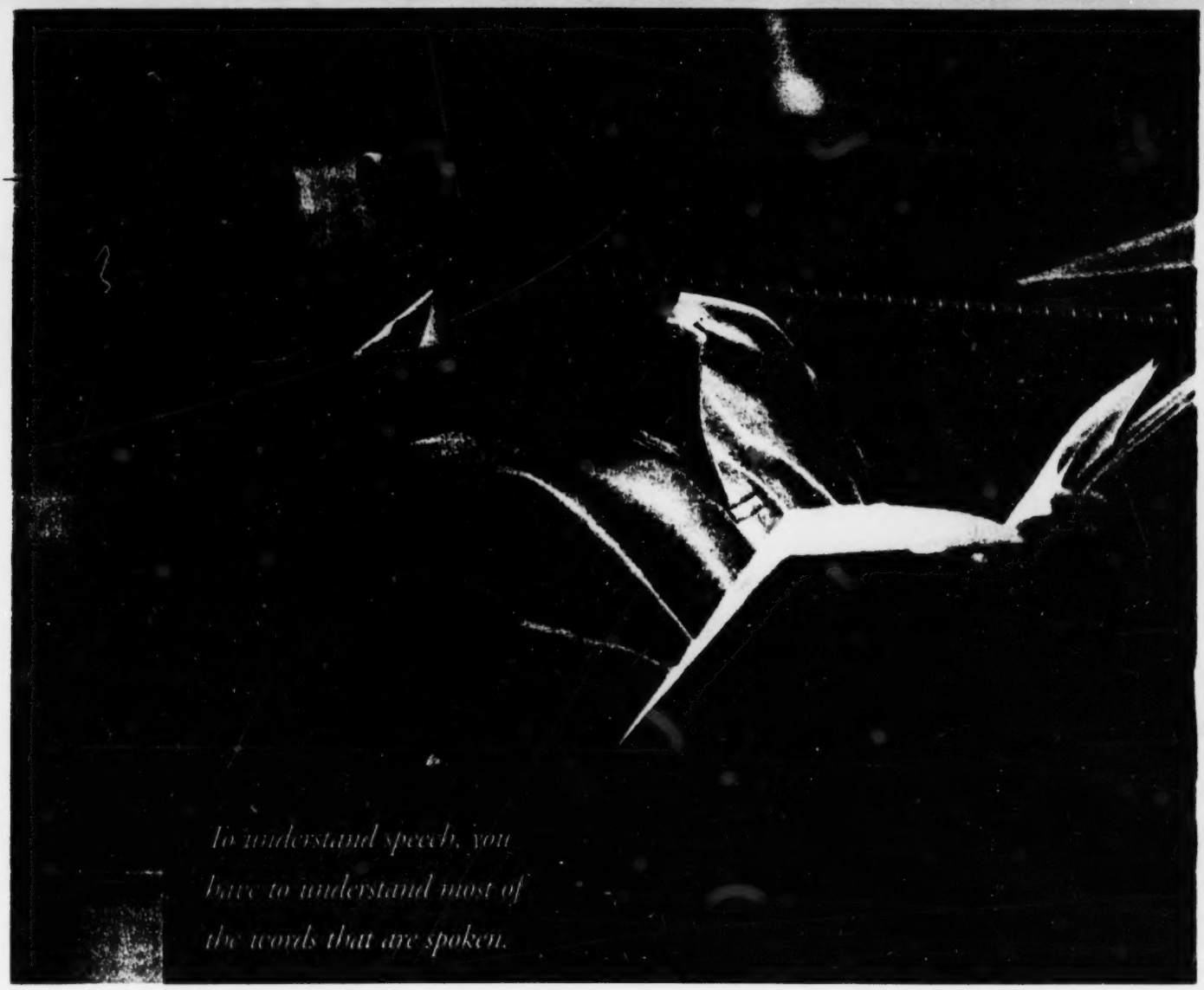
Assessment tip: A cloze assessment can be modified to assess syntax. Give students sentences with selected words missing, and ask them to supply syntactically appropriate words. Remember, there is no single correct answer in this type of assessment: The child's response may not make sense, yet still may be syntactically correct. For example, the sentence, "Mark lifted a _____ over his head" can be completed with any noun or noun phrase—"train" "pillow" or "dream" could all fit there. For young children, this test should be presented orally.

SEMANTICS

The ultimate goal of language is to convey meaning. While phonology carries information that makes spoken words distinct, and syntax constrains the arrangement of words in language, semantics refers to the information contained within the language. Semantics is a global term that collectively describes meaning at three different levels of language; the discourse / sentence level, the vocabulary level, and the morphology level.

Semantics at the discourse / sentence level

The celebrated linguist, Noam Chomsky, coined the sentence, "Colorless green ideas sleep furiously," to illustrate the fact that phonology and syntax can be preserved even in the absence of semantics. The words in the sentence are composed of speech sounds found in English (otherwise, the words themselves would not make sense), and the sentence is syntactically correct (the words sound right together), but the sentence is not semantically acceptable.



Artificial, meaningless sentences like Chomsky's do not come up often in typical conversation, but children often face real sentences that do not make sense to them. To understand or gain meaning from speech, a listener must examine meaning at several different levels simultaneously. At the more global level, meaning can be examined at the level of discourse, sentences, and phrases. As Chomsky's sentence illustrates, it is possible to combine meaningful words in meaningless ways, but this is not typically a problem. People do not make a habit of producing meaningless sentences deliberately. More typically, when m ning breaks down at this global level, it is because a sentence has meaning for one person but not for another. (Or the sentence may mean something different for another person.) Similarly, meaning may break down at the global levels because certain statements or sentences do not fit appropriately in the discourse. If two people are discussing literature, and one of them interjects a non sequitur about baseball, the other may wonder if she has missed some part of the conversation.

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Semantics at the vocabulary level

Meaning can also be examined at the level of the individual word (vocabulary). If you were learning a foreign language, and you knew only the most basic words for communication, you would certainly have difficulty understanding a native speaker. If you have studied the language, you might understand a few of the words, and you might try to piece the words you know together to get the gist of the communication. You would be attempting to assemble meaning at the sentence or phrase level, but you really would not have much confidence in your understanding. You would probably perform poorly if you were tested on your comprehension, especially if you did not understand some of the words in the test. To understand speech, you have to understand most of the words that are spoken. (It is worth noting that while you can infer the meaning of a few words from context, you must understand most of the words in order to build that context.)

Children face this bewildering problem every day—people are constantly using words around them that they do not understand. New vocabulary is introduced on a daily basis. The average student learns about eight new words per day (3,000 words per year) for the first few years of formal education.

Semantics at the morphology level

The third and most basic level of meaning analysis is morphology, or the meaning of word parts. A morpheme is the smallest meaningful unit of speech, so a single word may contain more than one morpheme (e.g., the word "smallest" has two morphemes, "small" and "est"—each part has meaning). A child's vocabulary is greatly enriched when the child learns to examine the structure of words—to examine words at the morpheme level. The child learns that words with common roots have common meanings, and that affixes influence the meaning of a word in specific ways. Children use their understanding of morphology to learn new words, and when they learn to read, a good understanding of morphology helps children spell and pronounce words correctly (helping them understand why, for example, "doing" does not rhyme with "boing").

Instruction tip: The ultimate goal with semantics is to have children pay attention to meaning at the sentence or discourse level. This requires a strong vocabulary and an appreciation for morphology, but semantics goes beyond simply "knowing words." As you work with children, ask them to focus on meaning at different levels. Ask them to break words down and examine the meanings of the morphemes. Ask them to provide synonyms and definitions for words in context. But, further, teach them to examine the meaning of sentences embedded in stories. Teach them to use context to guess the meanings of unknown words and to look for the logical structure of stories.

Assessment tip: Like all of the elements under Language Comprehension, assessments in semantics are more valid if they are given orally. One way to test semantics is to ask children to look for logical inconsistencies in stories. Create sentences and stories that contain logical flaws (e.g., Mark liked to go for walks with Mary because he enjoyed being alone.). Then ask them to detect the logical inconsistencies.

DECODING AND THE COGNITIVE ELEMENTS THAT SUPPORT IT

The problem of learning to read, as stated previously, is made up of two equally important components: language comprehension and decoding. Even among children who have adequate language comprehension skills, there are children who have difficulty reading because they have only mastered one of the two components. Just as some children are fortunate to be raised in environments rich in language experiences, some children are fortunate to be raised in homes surrounded by literature and text. Usually, these environments are one in the same, but not always. Some children, for example, come from cultures with rich storytelling traditions, but with limited use of text and writing. There are many children who are only rarely exposed to text in their household who enter school with only scant appreciation for what text is. To be a good reader, a child will need to understand what text is, how it works, and what it is used for. Unfortunately, as every teacher of young children knows, not all children have the same foundations for literacy. The appreciation for text that children have when they come to school varies tremendously, and this variability needs to be addressed as early as possible. Each child's text-related skills must be assessed, and focused instruction in appropriate reading and writing skills should start as soon as the child comes to school, be that in first grade, kindergarten, or pre-kindergarten.

Researchers have found that a child's ability to decode words in the first grade is an excellent predictor of the child's reading comprehension skill in the fourth grade. Many organizations, such as the International Reading Association (IRA) and the National Association for the Education of Young Children (NAEYC), have published position statements saying it is never too early to begin literacy instruction, and that literacy instruction should be the concern of anybody working with young children (pre-school, daycare, etc.). The assessment and instruction provided in these vital first years of formal education should focus on the cognitive elements that research has shown to be crucial to the process of developing decoding skills. These areas include cipher knowledge, lexical knowledge, an awareness of phonemes, knowledge of the alphabetic principle, knowledge of letters, and understanding concepts about print. Each of these cognitive elements can be examined in detail.

The assessment and instruction provided in these vital first years of formal education should focus on the cognitive elements that research has shown to be crucial to the process of developing decoding skills.

CIPHER KNOWLEDGE

Cipher knowledge basically refers to the underlying knowledge that allows children to read and pronounce regular words correctly. The term "cipher knowledge" may not be a familiar term, but it is a technically precise term, and if teachers are to become experts, they should become familiar with the correct terminology. The technically precise term, "cipher knowledge," is used here to distinguish it from "decoding," and teachers should understand how a "cipher" differs from a "code."

While a cipher refers to a regular and consistent relationship, a code refers to a more arbitrary and nonsystematic relationship. If you were to replace every letter in written English with a number (e.g., a=1, b=2, c=3, etc.), then you would have developed a cipher, and "deciphering" it would be a matter of following basic rules of translation. On the other hand, if you were to replace whole words with arbitrary numbers (e.g., "the"=11, "of"=21, "and"=13, etc.), then you would have created a code, and a codebook would be required for translation. Thus, when we talk about "deciphering" text, we are talking about the ability to "sound out" regular words (sometimes called "word attack" skills). Cipher knowledge, then, is demonstrated when a person appropriately sounds out words she has never seen before.

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Early in the development of cipher knowledge, children learn that certain letter combinations are valid and others are invalid. Young children who are gaining cipher knowledge, despite limited vocabularies, are able to tell that "pem" could be a word, but that "pvm" could not possibly be.

As children continue to develop cipher knowledge, they begin to understand that the English writing system is, for the most part, regular and consistent. They understand, at least implicitly, that words with similar spellings are usually pronounced similarly. Children quickly start to recognize common letter groups in words, and they begin to "read by analogy." Thus, when a child who has realized that words with similar spellings are pronounced similarly comes across a word she has never seen before, such as "pone," she can pronounce it correctly based on her knowledge of other similar words that she is familiar with, such as "lone," "prone," "bone," "tone," "phone," "zone," or "cone." There is some small possibility that her pronunciation will be incorrect ("pone" might rhyme with "done" or "gone"), but chances are the new word will follow the same pattern as known words with similar spellings.

This ability to decipher words is critically important to decoding, and its usefulness can not be overstated. This ability, like the English language itself, is generative, and the foundation of decoding rests upon the ability to decipher.

Instruction tip: Deciphering and decoding are not the same thing—using the spelling-sound knowledge about letters in the English language to "sound out" words is deciphering. Pronouncing words correctly regardless of whether they are regular or irregular is decoding. If a child pronounced "steak" so it rhymed with "beak," the child would be deciphering the word, but not decoding it. When teaching children cipher knowledge, it is best to take the emphasis off of correct pronunciation, and reward children for correctly sounding-out words (or, if possible, avoid using irregular words in that lesson).

Assessment tip: For younger children, make up simple nonsense words, and ask them to name them. Children who can decipher words have no trouble reading words like "hin," "vab" or "lat." For older children, either make up nonsense words that are more appropriate for older children (e.g., "porviate"), or make up a list of people's names that can be deciphered (e.g., "Marty Fendrick"). Tell the children you'd like them to pretend they are a teacher calling roll.

LEXICAL KNOWLEDGE

Again, a technically precise, although probably unfamiliar term is used here: Lexical knowledge simply refers to the knowledge that enables a child to correctly recognize and pronounce familiar, irregular words. As discussed earlier, the English writing system is fairly structured with some fairly consistent spelling-sound relationships. Some have attempted to formally identify a set of "rules" that capture English spelling-sound relationships, but these attempts have always been somewhat unsatisfactory—there

Reading specialists call this internal representation of all of the words we know our "lexicon" — basically, it is the dictionary in your head.

are always many exceptions to any rule. For example, in a phonics lesson, the teacher may tell the children, "Words that end in silent-e have long vowels," but that is only true 60 percent of the time. Children seem to be much better at recognizing patterns and making generalizations based upon observed patterns than at applying explicit rules when decoding words.

The consistent patterns that exist in the English writing system would be described as the "cipher" (see Cipher Knowledge). As children try to identify patterns, however, they are faced with potentially confusing information because many words in English are "exception" or "irregular" words. The pronunciations of these irregular words are not consistent with other words that are spelled similarly: "Colonel" really should not sound like "kernel," and "tongue" ought to be spelled T-U-N-G. Unfortunately, in order to become proficient readers of English, children must be able to fluently and correctly identify both regular and irregular words.

Fortunately, even for irregular words, most of the word can be accurately deciphered or "sounded out." The irregular word, "friend," for example, is only irregular because of the vowel sound—the rest of the word is regular. Deciphering the word results in a pronunciation that is nearly correct—close enough that the young reader can usually figure it out. (Extremely irregular words like "colonel" and "aisle" are actually rare in English.) When a child encounters a regular word, deciphering it is enough, but when she encounters an irregular word, after attempting to decipher it, the child may need to mentally compare that word against other known words. To do this, the child needs an internal representation of all of the words she knows that includes information about spelling, pronunciation, conjugation, meaning, and

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other relevant details. Reading specialists call this internal representation of all of the words we know our "lexicon"—basically, it is the dictionary in your head. To correctly pronounce irregular words, young readers depend upon their lexical knowledge, which develops with practice, feedback, and exposure to text.

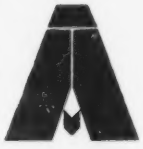
Lexical knowledge develops throughout a reader's life. (Even adults are constantly learning new words—you, for example, might have just learned the word "lexicon.") But the development of lexical knowledge is most visible in children. Young readers start out as sight-word readers: They memorize words as wholes, or they look for some salient feature in a word. Sight-word reading is extremely inefficient and very limited, but the few words the young reader is familiar with are all pronounced correctly. (Whether the word is regular or irregular is not relevant at this point.)

When the child realizes the limitations of memorizing whole words and starts learning to decipher words, she may appear to be taking a step backwards. She might struggle to recognize and correctly pronounce irregular words that she seemed to know previously. Eventually, through experience with the words and with feedback from the teacher, she will begin to learn correct pronunciations for irregular words. The more the child reads, and the more feedback she gets, the more irregular words she will be able to identify correctly.

Instruction tip: Sit with a child (preferably a child who has learned to "sound out" words already) and a book. On each page of the book, ask the child to search for irregular words that you say aloud. ("Can you find the word 'sword' on this page?") Be sure to use words that are within the child's speaking vocabulary.

Assessment tip: Ask the child to find five words in a book or a list that are "not spelled the way they sound." Further, ask the child how each word would be pronounced if you just "sounded it out."

PHONEME AWARENESS

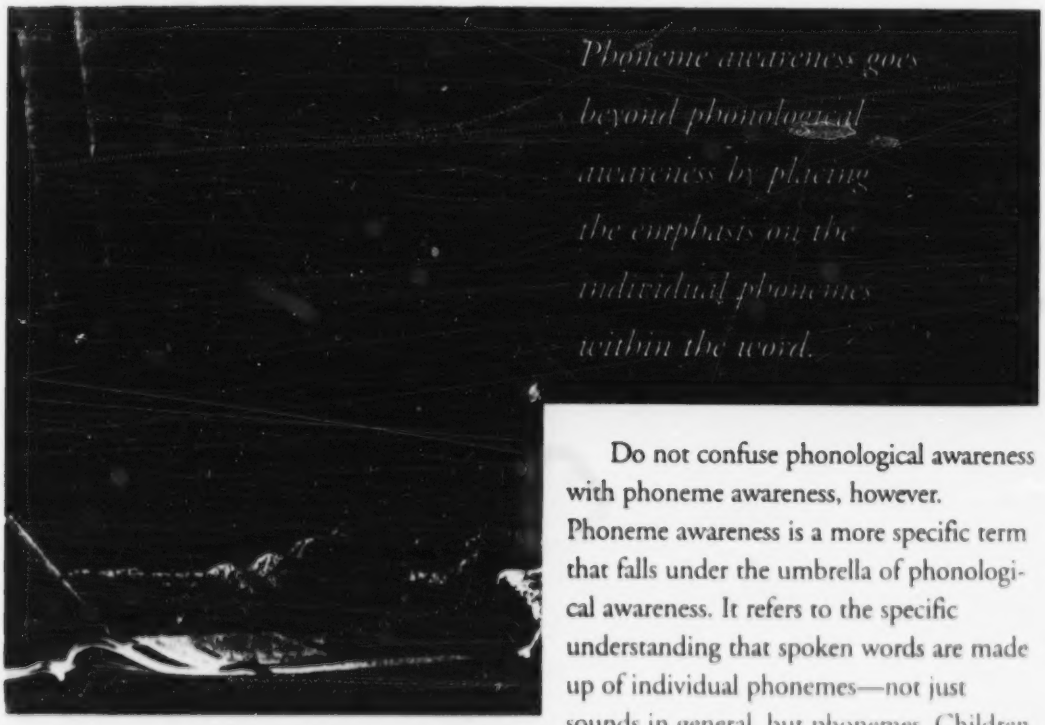


Spoken words are made up of sounds. This is obvious to adults, but it is surprisingly obscure for young children who perceive spoken words as wholes. Within a word, there may be other words (as in the case of compound words). There may also be multiple syllables. And, of course, every spoken word is comprised of phonemes.[4]

When a child becomes generally aware of the fact that spoken words are made up of sounds, she is described as having "phonological awareness." Phonological awareness can take the form of awareness of rhyme, awareness of syllables, awareness of the onsets of words, etc.

[4] A phoneme is the basic building block of spoken words. Phonemes are assembled to create and distinguish words. In an alphabetic language like English, most of the phonemes are represented by a letter or, in some cases, a few letters. The word "vote" for example has four letters, but only three phonemes—/v/ /o/ and /t/. (When we write about spoken sounds, we represent them by putting slash marks on either side of their written form. The letter *t* usually represents the sound /t/, and the letter *v* represents the sound /v/.)

Phonological awareness is different from phoneme awareness. Or more precisely, phoneme awareness is a type of phonological awareness. Skills that would generally be described as phonological awareness skills include the ability to rhyme words, the ability to break words into syllables, and the ability to break syllables into their onset and rime. Phoneme awareness goes beyond phonological awareness by placing the emphasis on the individual phonemes within the word. Phoneme awareness skills, then, would include the ability to isolate a phoneme (first, middle, or last) from the rest of the word, the ability to segment words into individual phonemes, or the ability to delete a specified phoneme from a word.


Phoneme awareness goes beyond phonological awareness by placing the emphasis on the individual phonemes within the word.

Do not confuse phonological awareness with phoneme awareness, however. Phoneme awareness is a more specific term that falls under the umbrella of phonological awareness. It refers to the specific understanding that spoken words are made up of individual phonemes—not just sounds in general, but phonemes. Children with phoneme awareness know that the word "wait" is made up of three phonemes, and that the words "pill" and "map" both contain the phoneme /p/. In short, they know that phonemes are the building blocks of spoken words, and that these building blocks can be rearranged and substituted to make different words.

Phonological awareness is a step in the right direction, but phoneme awareness is what is necessary for the child to understand that the letters in written words represent the phonemes in spoken words (the alphabetic principle). Understanding that the letter *m* stands for the sound /m/, by itself, is not phoneme awareness. Teachers need to ensure that children understand that, for example, the word "camel" has an /m/ sound in it, and that the /m/ sound in the middle of "camel" is the same as the /m/ sound at the end of "home" and at the beginning of "moon."

Phoneme awareness and phonological awareness are often confused with phonics, but phonics is an instructional approach that emphasizes letter-sound relationships and rules for pronunciation. The emphasis in a phonics classroom is the mapping between letters and phonemes (as in the previous example—the letter *m* represents the sound /m/). Phoneme awareness is not necessarily related to phonics. It is possible for a child to have phoneme awareness without having much experience with written letters or with letter names, and conversely it is possible for a child to provide examples of letter-sound relationships without ever developing phoneme awareness (a child with no phoneme awareness may know the letter *m* represents the sound /m/ without knowing that the word "ham" has an /m/ sound in it). Many children do not develop phoneme awareness from traditional phonics instruction; simply learning letter-sound relationships does not necessarily help a child to gain phoneme awareness. New phonics programs are incorporating explicit instruction in phoneme awareness, but traditionally, phoneme awareness instruction was never a part of phonics classrooms.

Another concept that people often confuse with phoneme awareness is phonology. However, phonology (as discussed in the elements under Language Comprehension) has to do with being able to distinguish between similar phonemes when they are embedded in the context of whole words. Phonology has to do with being able to hear the difference between the spoken words "sip" and "ship;" phoneme awareness has to do with being aware that the word "sip" is made up of three sounds: /s/, /i/ and /p/. Most children entering school have normal phonologic skills, but most children lack phoneme awareness when they come to school. For most children, phoneme awareness must be explicitly taught.

The importance of teaching phoneme awareness cannot be overstated. Hundreds of studies of phoneme awareness conducted over the past 25 years indicate the following:

- Phoneme awareness is essential to the process of learning to read.
- Explicitly teaching phoneme awareness facilitates later reading acquisition.
- Some reading failure has been linked to a lack of phoneme awareness.

As important as it is, however, it is possible to go overboard teaching phoneme awareness. English contains many confusing phonemes such as diphthongs and glides that even mature, experienced readers can have trouble identifying. (How many phonemes do you hear in "play" or "cube"?) Furthermore, certain phonemes are not universally defined. (What are the phonemes in "wring" or "fur"?)

It is important for the teacher to remember that a child does not need to be an Olympic champion at phoneme manipulation; she just needs to demonstrate knowledge of the fact that spoken words are made up of phonemes and that phonemes can be rearranged and manipulated to make different words. That level of awareness is all a child needs to understand the alphabetic principle (more on that later), which is the only reason that phoneme awareness is important in learning to decode text. An appropriate level of phoneme awareness can be instilled and supported with a select subset of phonemes. Phoneme awareness can be taught using words that do not contain consonant clusters or glides, and that have phonemes which are easy to pronounce in isolation. (The phoneme /b/, for example, is often avoided in phoneme awareness lessons because it can not be pronounced without a subsequent vowel sound. Pronouncing /b/ so that it sounds like /buh/ is confusing to a child trying to develop phoneme awareness.)

Instruction tip: One game that children like to play is "I spy with my little eye." You can use this game to enhance phoneme awareness by having children look for objects whose names begin with certain sounds. (Don't use letters in this game; use sounds.) To make it more challenging, have the children look for objects whose names end with certain sounds.

Assessment tip: Use the "Turtle Talk" game to assess the child's phoneme segmentation ability. Sit one-on-one with a child; tell her that, in addition to walking slowly, turtles talk slowly. Ask her to take a breath after every sound she makes. Demonstrate for the child how a turtle would say the word "man" (/m/ /a/ /n/ taking a clear breath between each sound). Try to use words that have phonemes that are easy to say in isolation, such as /t/ /m/ and /f/. Avoid words that contain phonemes like the hard /g/ and /b/ because they can not be said without adding a vowel to the end (so they sound like /guh/ and /buh/). Also, start with simple words, and build up to more difficult words.

KNOWLEDGE OF THE ALPHABETIC PRINCIPLE

Photo by Pamela Porter

Not every language has an alphabet. In Japanese, the symbols in text represent syllables; in the traditional Chinese writing system, each symbol represents a whole word. In most western languages, however, the symbols in text represent phonemes. Knowledge of the alphabetic principle refers to an understanding that spoken words are made up of phonemes (phoneme awareness) and that those phonemes are represented in text as letters. An understanding of the alphabetic principle is the cornerstone on which English literacy is built. Unfortunately, it is a concept that children often fail to grasp (usually because they lack phoneme awareness, and therefore, do not understand what letters in text represent).

To master decoding, and to make sense of letter-sound relationships, a child must first make the connection between the symbols on the page and the sounds in speech. Specifically, she needs to understand that the letters in written words correspond to the phonemes in spoken words. A child who is "sight reading" can see a symbol on a page and know that it stands for a spoken word, but the symbol that she is seeing is the whole word. Teachers need to focus the child's attention on the letters that make up written words and the phonemes that make up spoken words.

Similarly, some children are able to demonstrate a knowledge of letter-sound relationships without actually understanding the alphabetic principle. Such children are able to report that the letter *s* makes an /s/ sound, but they really do not understand that "fast" and "seat" both have an /s/ sound in them, and that the /s/ sound is represented by a letter when you write the word.

Instruction tip: Role reversal sometimes helps children grasp the alphabetic principle. Encourage your student to make up vocabulary words for you to write down. They should not be real words, but should be nonsense words that the child creates. Show the child that you are faithfully recording the sounds she is making; ask her to clearly enunciate each sound so you can write it down accurately.

Assessment tip: Pay attention to how the child writes. For the purposes of assessing the child's understanding of the alphabetic principle, it does not matter whether the child writes accurately. What matters is that she writes approximately one symbol per sound. The symbols do not even have to be letters, as long as words with three phonemes are represented in her writing by three symbols.

LETTER KNOWLEDGE

The letter is the basic unit of reading and writing, and letter knowledge has consistently been shown to be one of the best predictors of later reading success. A child beginning to read should be familiar with these elements of text, but simple knowledge of the alphabet is not enough. For a child, the alphabet is an arbitrary poem or song filled with meaningless babble. (Most people are familiar with the fact that children often think that "lmno" is a single unit.) The alphabet song does not necessarily have any more meaning to a child than any other song, and many children learn to recite the alphabet without any understanding of what they are reciting.

Before they can read, children must be comfortable and familiar with the letters of the alphabet. They should be able to identify the letters in different fonts and type case, and they should be comfortable with handwritten letters as well as letters embedded within words (as opposed to presented in isolation). Most importantly, they should be able to discriminate one letter from the other letters of the alphabet (e.g., what features of the letter *p* make it different from the letter *q*).

A variety of approaches are used for teaching children the letters of the alphabet, and some approaches are more effective for some children than for others. When learning about letters, some children find it easier to learn the letter sounds rather than the letter names. (This approach for teaching letter-knowledge is often associated with the Montessori approach.) Some children are already familiar with the letter sounds, and learning to match the symbol or symbols that could be used to represent each sound may be less confusing for those children.

Similarly, some children find it easier to learn about the shapes of the letters first, before learning letter names. Once they are able to sort the letters into different categories (letters with curved parts, letters with straight parts, letters that stick up, letters than hang down, etc.), then they are able to attach names to the different letters. As with anything else, when learning something new, it is always easier to build onto familiar information.

Instruction tip: For young children who are just learning the letters, rather than just teaching them the letter names, have the children sort the letters into groups by their features—letters with curves, letters with straight lines, letters with both, etc. This helps children see that some letters are similar, but still different (such as the *u* and *n* or the *n* and *h*). Once they see these differences, they will be less likely to confuse them later.

Assessment tip: Present letters to the child in both uppercase and lowercase and in random order. Ask the child to "tell you about each letter." Have her give the name, or a sound that it represents, or a word that begins with that letter. Make note of hesitation or confusion.

CONCEPTS ABOUT PRINT

Many young children are unaware of text, and have no understanding of what it is or how it works. Often, these children think that the pictures in books contain all of the information, and that when people "read," they are using the pictures as the source of information. It has been often documented that when children first engage in play-reading behavior, they typically focus their attention on the pages with pictures. However, as children mature and gain more text experience, their attention moves to the pages containing the text. Children who are developing healthy concepts about print flip through books from beginning to end (holding them right-side-up), and they point to the text they are "reading" (even though they may be telling a story unrelated to the actual text). As they point, they may even demonstrate the understanding that text is read from top to bottom in sweeps from left to right, and they may point at the individual words in the passage (as opposed to pointing at random locations in the line).

A child's early attempts at writing can give many insights into her concepts about print.

Also, a child's early attempts at writing can give many insights into her concepts about print. Even though the child's writing is not recognizable as anything more than scribbles, an observant teacher may notice that the child is scribbling in lines starting at the top of the page—one above another—and each line is scribbled from left to right with spaces between scribbles on a line. These outward behaviors, to the trained eye, are demonstrations of the child's understanding of the mechanics of text.

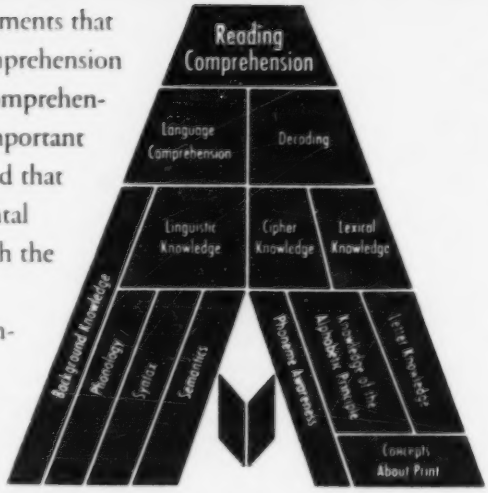
As they learn more about text and the rules that govern text construction, children very quickly develop concepts about the way text is "supposed" to be. They may even go through a period where they do not want to write any more because they are not able to do it "right." This can be discouraging for a teacher, but this behavior is a sign that the child is developing healthy concepts about print. For children who grow up with rich text experiences, print concepts often develop without any explicit instruction, but for children who grow up in a text-poor environment, understanding the mechanics of print may require explicit instruction.

Instruction tip: When sharing a book with a child, it is always a good idea to explain what you are doing as a reader. Point to the words as you read, show her what the punctuation is for, and encourage her to take part in the reading activity (pointing to the words, or turning the pages).

Assessment tip: Hand a book, closed and face down, to the child and ask her to open it and to point to the words so that you can read. Read each word as the child points. The child should move from word to word as you do. Ask older children to find uppercase and lowercase letters in the text, and to describe the function of the punctuation.

READING COMPREHENSION

We have described many elements that support good reading comprehension here. We have said that reading comprehension depends upon two equally important skills (language comprehension and decoding), and that each of those skills depends upon more fundamental skills. This suggests that a teacher should first teach the fundamental skills before teaching the more advanced skills, but that is certainly not our recommendation. The cognitive elements we have described here tend to develop congruently in a young reader's mind, and the elements, as they develop, serve to reinforce each other. Further, the development of these elements is not very predictable—it varies from child to child. The message that we are trying to convey with this framework is that all of these elements are important, and that teachers need to be mindful of each child's individual literacy development.



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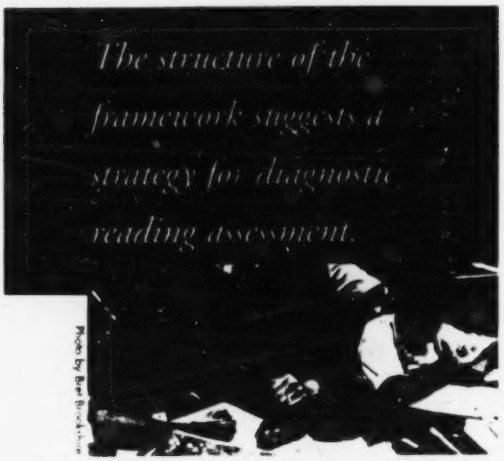
The structure of the framework suggests a strategy for diagnostic reading assessment. If a child can not read grade-appropriate text, the first two areas a teacher should examine are the child's language comprehension skill (could the child understand the text if it was read aloud to her), and the child's decoding skill. If problems are uncovered at that gross level, the rest of the framework suggests a strategy for examining more fundamental reading skills.

The structure of the framework is not meant to suggest that reading comprehension can not occur until all of the more fundamental cognitive elements are fully developed. Reading comprehension is like the motor in a car—if every part functions well and the motor is put together properly, the motor as a whole will function well, but even when some of the parts are not functioning very well, the motor sometimes still runs, albeit poorly.



It is unclear when reading comprehension begins. It could be argued that reading comprehension in its most fundamental form begins when a child first makes the connection between symbol and concept. For some children, that may come from environmental print; for others, that may come from recognizing their own printed name. A child who has not developed the knowledge necessary to "sound out" words but who can recognize a few hundred "sight words" is able to "read" and understand certain basic text, as long as the words in the text are within her sight-word vocabulary. The motor runs, it just does not run well, and it only runs when conditions are right.

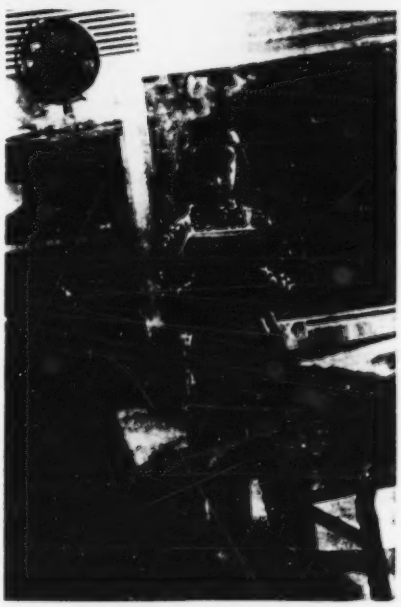
Stretching the motor analogy further, all of the parts of a motor may be independently functional, but the motor will not run if the motor itself is not assembled correctly. The cognitive elements that give rise to good reading comprehension are not isolated from each other. We have presented them in this framework as if they were fractured and modular, but we did so only to describe them, and to see how they relate to each other. Our presentation should by no means be taken as an indication that reading ***instruction*** should be fractured and modular. Children sometimes have trouble putting the pieces together and understanding how these basic skills relate to reading. It is common for children to be comfortable and competent with drills from phonics lessons but to be unaware that they should apply that knowledge to unfamiliar words in text. Likewise, it is common for children to not recognize that the sounds they hear in their phonics lesson are the same sounds they hear in speech. A good reading teacher does not merely teach the basic skills, but also teaches how those basic skills relate to each other and helps children integrate these various elements to support their reading development.

Reading comprehension is a skill with a knowledge base just like all of the elements that support it, and as such, it can and should be taught explicitly. The teacher can help the student develop an appreciation for the different types of reading comprehension (literal comprehension, inferential comprehension, and evaluative comprehension), and the different types of

text (expository, narrative, formal, informal) and can introduce the child to the differences in literary genres. The child can be encouraged to move from a mastery of oral reading to a mastery of more efficient and mature silent reading, and along with teaching explicit strategies to improve comprehension, the teacher can help the child learn to monitor her own comprehension of text as she reads.

PUTTING THE PIECES TOGETHER

Let us return to our child sitting in a comfortable chair, reading silently to herself. We now know that she is ***decoding*** the text, quickly and automatically, and she is depending on her ***language comprehension*** ability to comprehend the decoded text. Now we know that her ability to decode the text depends upon some fundamental, interrelated cognitive elements. Her ability to decode the text is grounded in her understanding of the mechanics of text ***(concepts about print)***, her knowledge that spoken words are made up of phonemes ***(phoneme awareness)***, her familiarity with the letters in the language ***(letter knowledge)***, her knowledge that the letters in the written words represent phonemes ***(alphabetic principle)***, and her ability to bring these elements together to ***decipher regular words***. Further, because she makes a habit of reading and has been exposed to a lot of text, she has been developing her ***lexical knowledge*** so that she can recognize and correctly pronounce irregular words. This last element will develop throughout her life as she reads more and more.



We also know that her ability to comprehend the decoded text depends upon her general ***language comprehension*** skills, and that her comprehension skills are also supported by a collection of interrelated cognitive elements. Her language comprehension skills are dependent upon her ability to perceive the ***phonology*** of the language, an appreciation for the rules of ***syntax*** in the language, and an understanding that words and sentences have meaning (*semantics*). She uses her ***background knowledge*** to elaborate on the information she is gathering, and the information she is gathering, in turn, modifies and enhances her background knowledge.

She is sitting, independently reading a book. As she does so, she is becoming more and more experienced and practiced with text. A few years ago, when she was learning to read, she struggled with decoding the text and connecting that text with meaning. Reading was laborious and unrewarding. However, somebody motivated her to keep trying and helped her gain the skills she needs to be a reader. Now she decodes words—both regular and irregular words—fluently and automatically, with such ease that she can fully focus her attention on comprehending the text.

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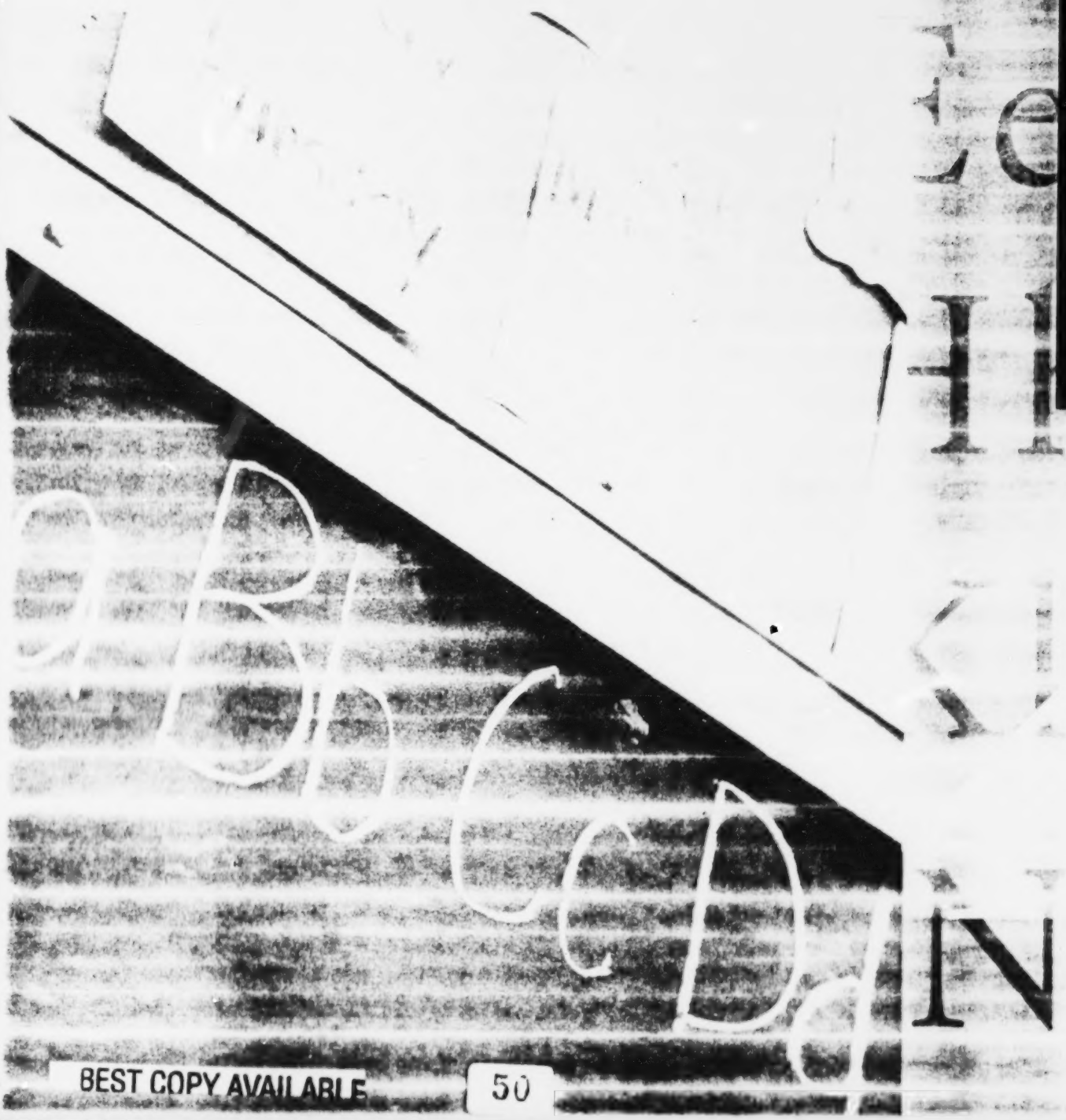
Using the Resources Online 47



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Using the Framework and Suite of Resources

The cognitive framework of reading acquisition described in these pages was created as the centerpiece of a suite of tools designed to help K-2 reading teachers develop effective, research-based, child-centered instructional strategies. The framework is the centerpiece because the first priority was to help teachers gain an "expert" view of reading acquisition. When multiple K-2 teachers on a campus all share this view, they can work more effectively as a team to organize reading instruction across grade levels. Using the framework as the "big picture" of reading acquisition, teachers can examine what each child should learn in each grade, and they can develop a more coherent reading program so that one class complements and supports the next. Using the framework and the suite of tools, teachers can develop campus-wide assessment strategies that better inform the developmental progress of individual children from year to year. Teachers can thereby better communicate assessment information to other concerned parties, such as parents, school administrators, and other colleagues.

Using the resources online

Most of these tools and resources can be accessed through SEDL's website, free of charge. They are also available on the CD-ROM that accompanies this document. Most of these tools and resources are being presented in electronic format because many of them are interactive, and it is not possible to convey the information effectively on paper. ***The Reading Assessment Database for Grades K-2***, for example, contains information about some 150 assessments. Those summaries could have been printed, but it is much more efficient to present that information in a searchable database.

SEDL is distributing this essential text describing the cognitive framework of reading acquisition in hard copy, but all of the text in this printed document is also available on the website and the CD-ROM that accompanies this document. The hard copy is more pleasant to read than electronic text, but it should be noted that while all of the text in this paper document is contained on the website, the reverse is not true: Many resources are included in the electronic version that were not reproduced in this paper document. Printing all of that information would be too cumbersome. That information is no less relevant to reading instruction, though, and we encourage teachers to spend some time looking through all that is available on the electronic version.

There is added benefit to the electronic format over the paper format—the electronic format made it possible to truly integrate all of SEDL's reading resources. These resources are moderately useful in isolation, but when combined and integrated, they provide a very rich information resource for teachers that is also useful to administrators and staff developers. We have described the cognitive framework of reading acquisition as the centerpiece around which all of the other resources were developed, and the electronic version of this suite of resources makes the reason for this description quite evident.

To use the electronic version, you start with the A-shaped graphical representation of the framework. The various cognitive elements are represented in the graphic, and to explore each element, you simply use the mouse to click on an element in the graphic that interests you.

Once you select an element, you have five "pathways" to choose from:

- You can find out more about the cognitive element itself by reading an in-depth description of the element.
- You can learn about assessment techniques and search our database for published reading assessments that specifically test that element.
- You can browse through our database of ideas for classroom activities that specifically support that element.
- You can access our bibliography for research articles related to that element.
- You can see how that element relates to the benchmarks and standards for each state in SEDL's region.

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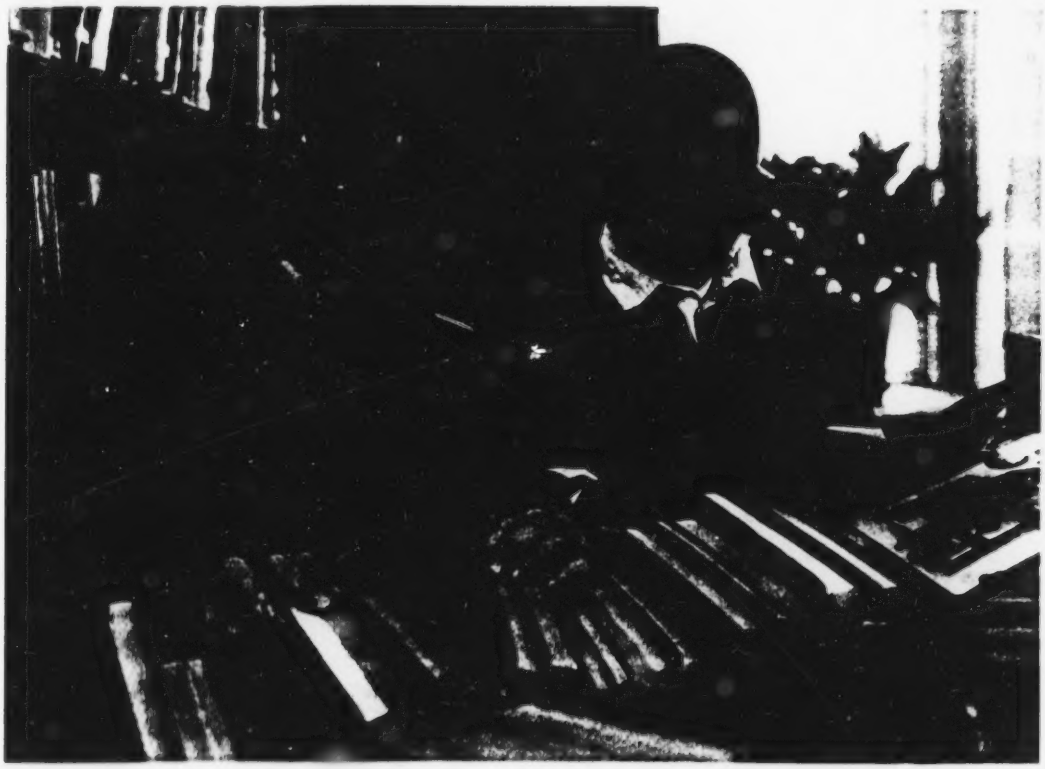
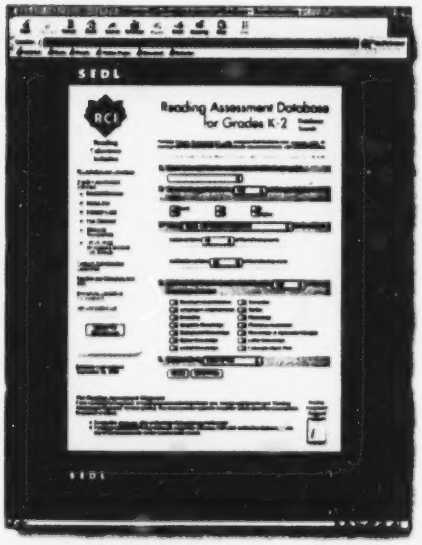


Naturally, most of these resources can be used alone. For example, the Reading Assessment Database has its own search-interface so you can perform more advanced searches for assessments. However, the way that most people will be introduced to SEDL's resources is through the lens of the cognitive framework of reading acquisition. We feel that when people see how they can use the framework as an organizing and sorting tool, they will begin to use it to organize and sort reading instruction in their own schools.



Alphabetic Principle – Spoken words are made up of phonemes, and written words are made up of letters. However, knowledge of those two facts is not sufficient for developing good decoding skills. Knowledge of the alphabetic principle refers to an understanding that the letters in written words represent the phonemes in spoken words.

Background Knowledge – In order to understand language, the child must have some background knowledge to use as a reference for interpreting new information. Moreover, if the child is expected to understand something specific, her background knowledge must be relevant to what she is expected to understand.

Cipher Knowledge – The relationship between the way a word is spelled and the way that word is pronounced in English is reasonably predictable. Certain conventions, collectively known as the English cipher, loosely govern English spelling and pronunciation. To be able to decode words, children need an implicit understanding of those conventions.

Concepts About Print – Understanding print involves recognizing and understanding the mechanics of text. A reader must understand that text contains a message; that it flows from left to right and from top to bottom; that individual words on the page correspond to individual spoken words, and so on. Written English has a structure, and understanding that structure is prerequisite to good decoding skills.

Decoding – Good readers are able to correctly pronounce familiar words (at the reader's level) whether they be regular or irregular words, and are able to pronounce unfamiliar words in a way consistent with the conventions of written English. For skilled readers, decoding is so automatic that it requires virtually no conscious effort, so the reader can devote full attention to the task of comprehending the text.

Language Comprehension – To read and understand text, a child needs to be able to understand language. Before expecting a child to be able to read and understand a story, the question should be asked, "Could the child understand this story if it was read ***to*** her?" An essential aspect of language comprehension hinges on the ability to draw inferences and appreciate implications—it is important to understand both the explicit and implicit messages contained in language.

Letter Knowledge – The letter is the basic unit of reading and writing in English, and familiarity with the letters of the alphabet has consistently been shown to be a strong predictor of future reading success. While not sufficient in itself for reading success, familiarity with the letters of the alphabet is important for developing decoding skills.

Lexical Knowledge – Some words cannot be easily sounded out because they do not follow the conventional letter-phoneme relationships—a child who attempts to sound out words like "one" and "two" will not arrive at the correct pronunciation. For these "exception" words, the child will need additional information about correct pronunciation.

Linguistic Knowledge – Most of the problem of understanding language hinges on the knowledge of the mechanics of that language. All languages have structure, and an implicit knowledge of that structure is essential to comprehension.

Phoneme Awareness – One of the most basic building blocks of speech is the phoneme, and to gain knowledge of the alphabetic principle, a child must be consciously aware that spoken words are comprised of phonemes. Further, that child must be consciously aware of the fact that phonemes can be substituted and rearranged to create different words.

Phonology – Speech is the most typical form of language, and in order to understand speech, a child must be able to clearly hear, distinguish, and categorize the phonemes within the speech. A child who is unable to distinguish between similar phonemes may develop difficulties with comprehension. A child who has difficulty with English phonology may not be able to hear the difference between words like "thin" and "fin" or "here" and "hair," and those words may confuse the child when they come up in context.

Reading Comprehension – Reading comprehension is composed of two equally important components. Decoding, or the ability to translate text into speech, is only part of the process of reading comprehension. The other part is language comprehension, or the ability to understand spoken language. All struggling readers have difficulty with either language comprehension or decoding or both.

Semantics – To understand language, a child must understand the meaning of word parts (morphology) and individual words within the language (vocabulary), but more than that, a child must understand that words are arranged in sentences and discourse in meaningful ways. The child must understand how to use language to communicate complete and meaningful ideas.

Syntax – Understanding isolated words is not adequate for the task of understanding language. All languages have rules regarding how words can be combined to form sentences, and an implicit understanding of the rules of sentence structure and phrasing is essential to comprehension.

SEDL

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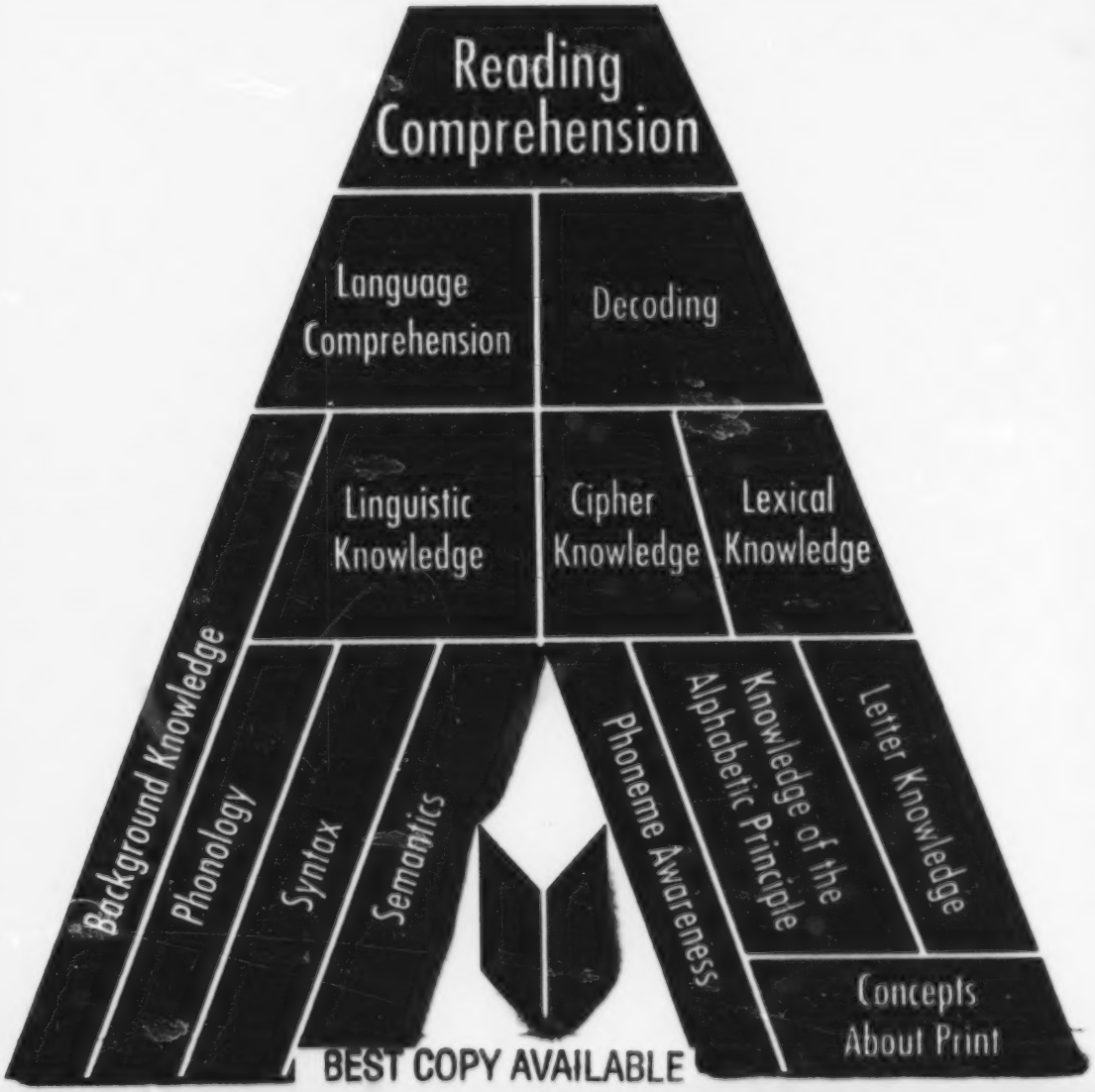
The Cognitive Foundations of Learning to Read:
A FRAMEWORK



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